Electronic Services - Los Angeles
M129448X

MODEL T262B/T263B

TRANSMISSION & NOISE TEST SETS

Control Manual

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MODEL
T262B/T263B
TRANSMISSION AND NOISE TEST SETS

1.0 GENERAL

1.1 Description

1.1.01 The Models T262B and T263B Transmission and Noise Test Sets are portable, compact, low cost, versatile instruments designed to have general application in the evaluation of voice-grade facilities. Connections are provided for two lines with switching to allow sending on either line while receiving on the other. They are useful in the evaluation of four-wire conditioned facilities, toll trunks, tie-lines as well as subscriber loops. The sets are powered either from internal batteries or from the 48V dc office battery. Figure 1-1 is a front view of the T262B/T263B.

1.1.02 Sending — The Test Sets send any one of ten tones, switch selectable, between 304 Hz and 3204 Hz at any level from +11 dBm to -41 dBm.

1.1.03 Measuring Tones — The Test Sets have the capability of measuring tones in the frequency range of 50 Hz to 20 kHz at levels from +11 dBm to -44 dBm. A high pass weighting, 200 Hz to 20 kHz, is provided to make transmission measurements while suppressing 60 Hz power influence on the circuit being tested.

1.1.04 Measuring Noise — The Test Sets have the capability of measuring both noise metallic and noise-to-ground with either a 3 kHz FLAT or a C-MESSAGE weighting characteristic. Circuit noise (METALLIC) levels from 0 to 85 dBrn and noise-to-ground (N-G) levels from 40 to 125 dBrn may be measured.

1.1.05 Test Termination — The Test Sets have the capability of providing a termination in place of the SEND generator output. This is particularly useful when measurements are being made on four-wire circuits and a Test Set is used on each end of the circuit. The TEST TERM may be pushed on the Test Set connected to the sending side of the four-wire circuit and at the far-end of this circuit a second Test Set is used to measure noise. The Test Termination is a standard impedance of 600 or 900 ohms in series with 2.16 µF.

1.1.06 Dial and hold capabilities are provided for each of the two lines.

1.1.07 Loop current into 200 ohms may be measured from 0 to 100 mA.

1.1.08 The T263B differs from the T262B in that it includes a 1010 Hz Notch Filter, switch selectable, for making noise measurements in the presence of a holding tone.

1.2 Accessory Cover Options

1.2.01 Optional cover assemblies are available for either the T262B or T263B. These are a Dial and Talk Circuit and a Variable Frequency Oscillator. A power supply is included as part of the Accessory Cover.

1.2.02 The Talk Circuit is for use with the 52 or 53 type headset or equivalent.

1.2.03 The Variable Frequency Oscillator is a source of stable tones over the frequency range of 50 Hz to 20 kHz in three ranges. The Oscillator provides a low distortion, variable signal source with three overlapping frequency ranges (from 50 Hz to 20 kHz). The center range covers the voice frequency band from 200 Hz to 4 kHz. An "LED" FREQUENCY Hz digital readout is illuminated when the DISPLAY switch is pressed. Figure 1-2 depicts the T262B/T263B cover options.

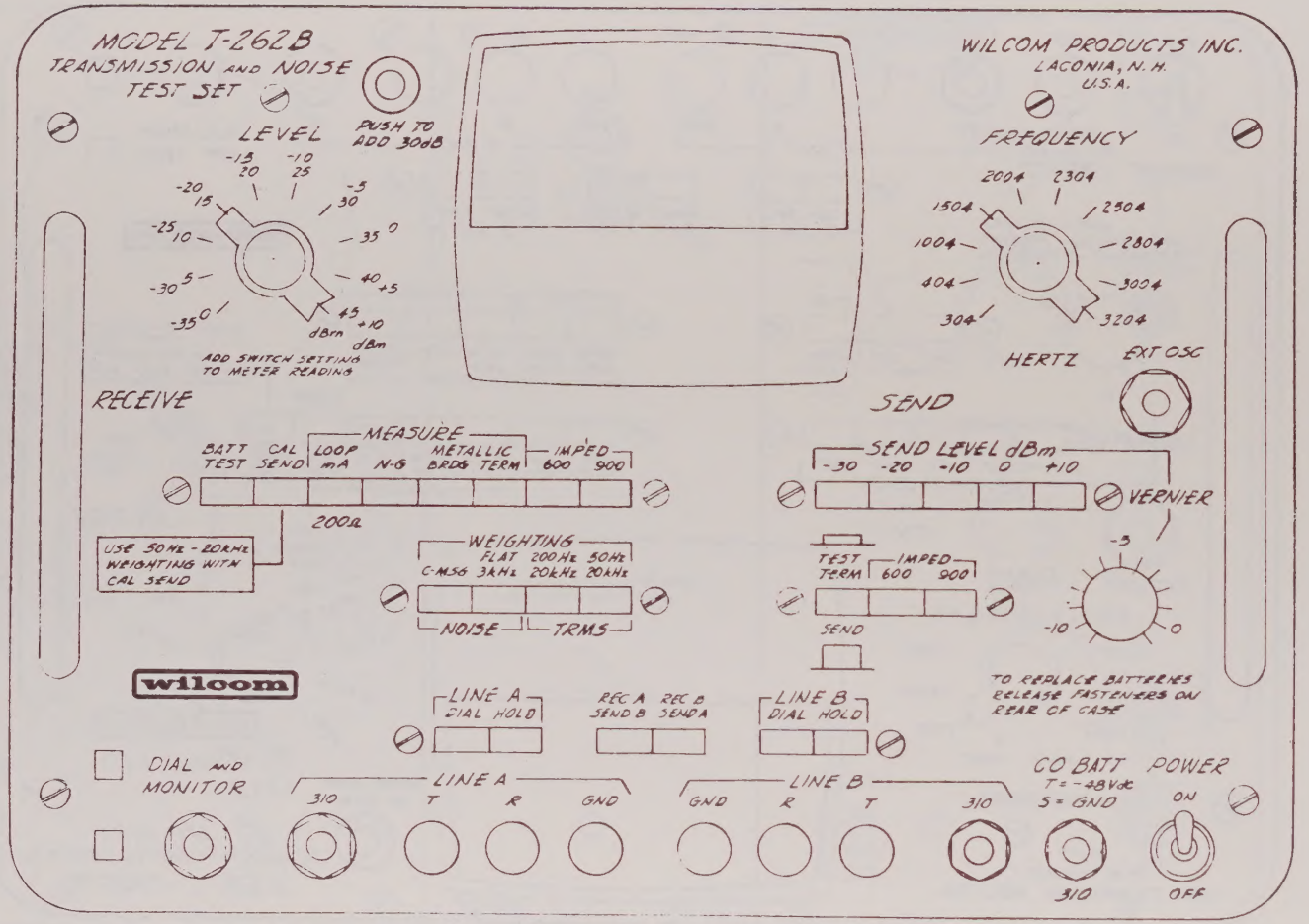

FIGURE 1-1a

TRANSMISSION AND NOISE TEST SET MODEL T262B

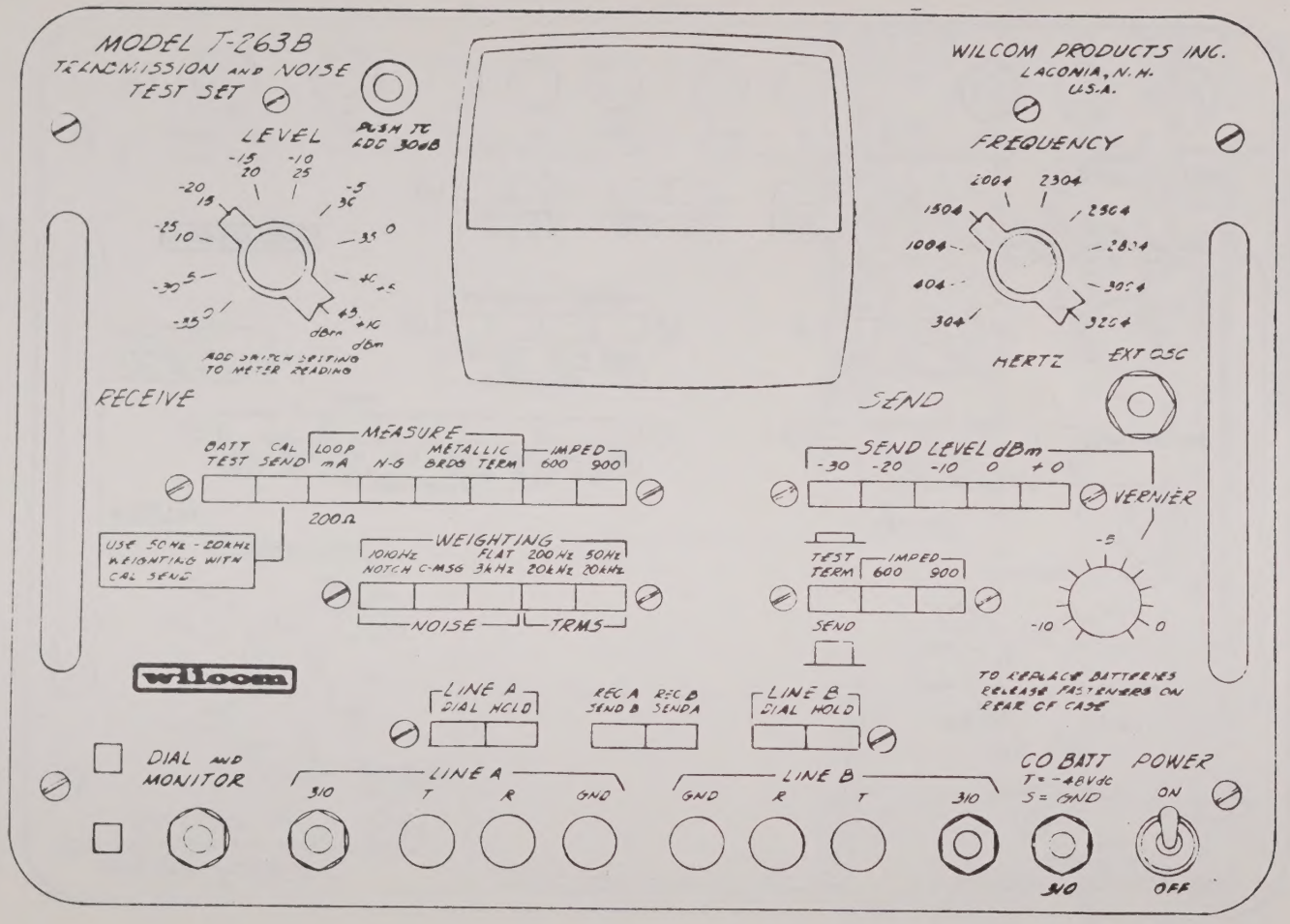

FIGURE 1-1b

TRANSMISSION AND NOISE TEST SET MODEL T263B

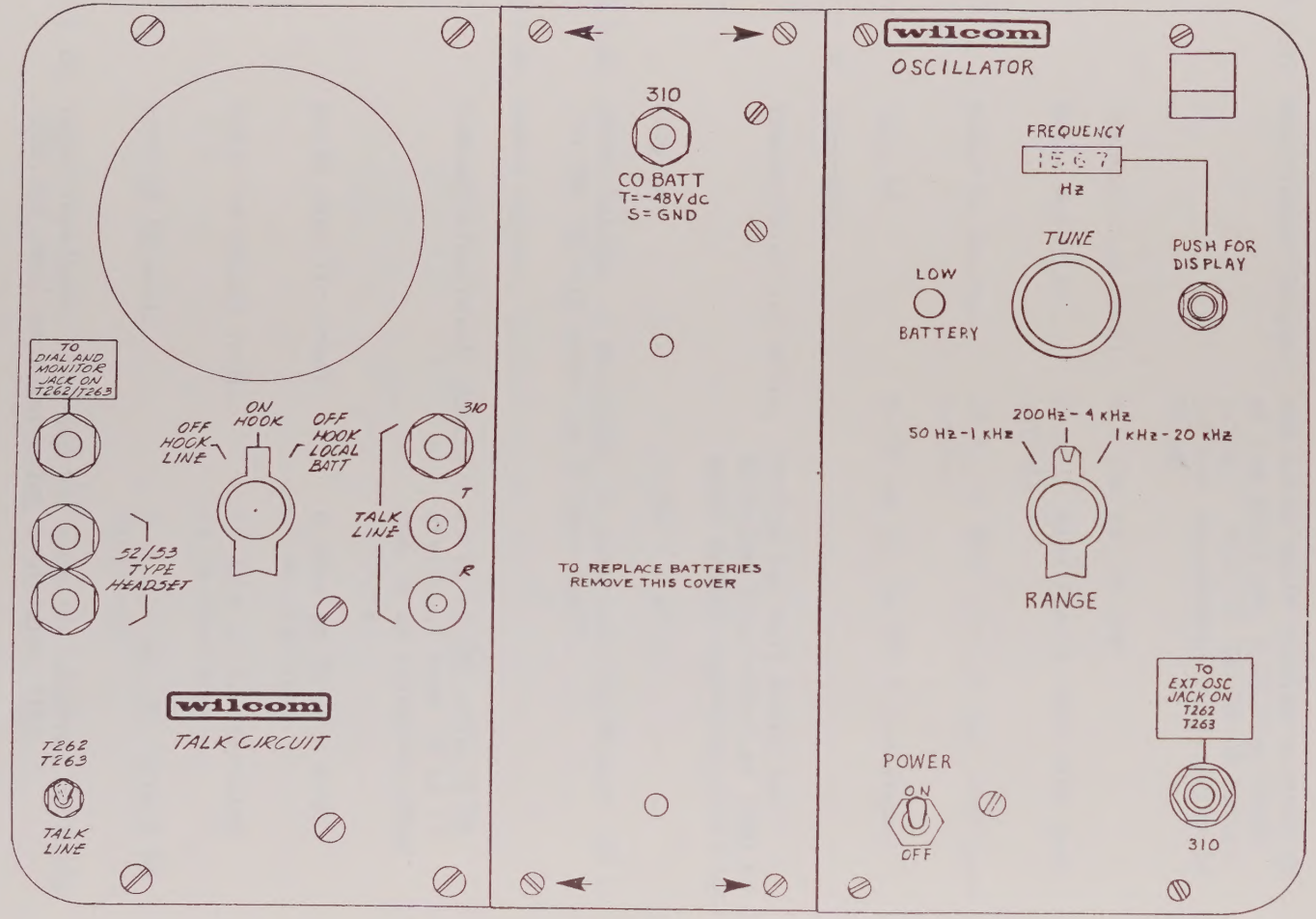

FIGURE 1-2

T262B/263B COVER OPTIONS

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2.0 SPECIFICATIONS

2.1 Receive Section

2.1.01 Measurement Ranges: Add meter scale reading to setting of ten position, 5 dB step LEVEL switch. PUSH TO ADD 30 dB button reduces measurement sensitivity by 30 dB.

Transmission Level: +11 dBm to -44 dBm

Noise Metallic: 0 to 55 dBrn (to 85 dBrn with push button)

Noise to Ground: 40 to 95 dBrn (to 125 dBrn with push button)

Loop mA: 0-100 mA dc, in 200 Ω resistance

2.1.02 Accuracy:

Transmission and Noise: Within one-half meter scale division (see below) at 1000 Hz under normal operating conditions.

Loop mA: ± (5% + 1 mA)

2.1.03 LEVEL Switch: 5 dB steps; 10 position, calibrated -35 to +10 dBm (black) and 0 to 45 dBrn (red).

2.1.04 Meter Scales:

Transmission Level (black): -9 to +1 dB, with .5 dB divisions from -9 to -5 and .2 dB divisions from -5 to +1.

Noise Metallic (red): 0 dBrn to 10 dBrn with .5 dB divisions

Noise-to-Ground (red): 40 dBrn to 50 dBrn with .5 dB divisions

Loop mA (black): 0 to 100 mA, dc, with 5 mA divisions.

2.1.05 Input Impedance: 600 and 900 ohms, dc blocked, bridging (100,000 ohms) or terminating (tolerance ±1%)

2.1.06 Longitudinal Balance: Better than 80 dB at frequencies below 6 kHz.

2.1.07 Weighting and Frequency Response:

Transmission: 50Hz - 20 kHz: Flat within ±0.1 dB 200 Hz to 4 kHz; within 0.3 dB full range.

200 Hz - 20 kHz: Flat within ±0.1 dB 500 Hz to 4 kHz; within .3 dB 300 Hz to 20 kHz; approximately 3 dB down at 200 Hz and at least 30 dB down at 60 Hz.

Noise: C-Message . As specified in Bell System Technical Reference PUB 41009
3 kHz Flat

1010 Hz Notch: (T263B only), >50 dB attenuation 995-1025 Hz, may be switch selected for use with either noise weighting.

2.1.08 Monitor: Permits listening to the signal being measured (after LEVEL setting and weighting) without interfering with the measurement. Monitor signal is connected to DIAL & MONITOR posts and 310 jack (see Line Circuits) to permit use of lineman's set for listening as well as dialing.

2.2 Send Section

2.2.01 Frequencies: 10 selectable frequencies:

304, 404, 1004, 1504, 2004, 2304, 2504, 2804, 3004, 3204, Hz, all ±0.25%

2.2.02 Output Level: +10 dBm to -40 dBm

2.2.03 Level Control: 10 dB step attenuator, 5 pushbuttons for -30, -20, -10, 0 and +10 dBm.

12 dB continuous level adjustment, -11 to +1 dB with respect to pushbutton selection.

2.2.04 Level Calibration: Switch selected internal connection to receive section for setting level.

2.2.05 Level Stability: Better than 0.1 dB after adjustment.

2.2.06 Total Harmonic Distortion: Better than 50 dB below fundamental.

2.2.07 Output Impedance: Switch selectable 600 or 900 ohms ±1%, balanced, dc blocked.

2.2.08 Test Termination: 600 or 900 ohms, as selected for output impedance, plus 2.16 μF. Can be switched across output terminals in place of the generator.

2.3 Line Circuits

2.3.01 Dual banana-plug binding post and 310 jack connections are provided for two external lines, designated LINE A and LINE B.

2.3.02 Line Switching: Either line may be switch selected for connection to the measuring circuits input. The other line will be connected to the generator output.

2.3.03 Dial Provision: A pair of clip-on terminals and 310 jack permit attaching lineman's telephone set for dialing a test number. Switches are provided for connecting either line to dial terminals and jack while disconnecting it from Receive or Send. If neither line is in DIAL, terminals and jack are connected to MONITOR.

2.3.04 Hold Circuit: A switchable electronic hold circuit is provided for each line:

Long Loop dc characteristic: 23 mA (±5%) when 46 volt source (minimum office battery) is applied through 1700 Ω external resistance (representing 450 Ω max battery feed resistance plus 1250 Ω max loop resistance).

Short loop dc characteristic: Current limited to 35 mA max.

Small signal ac characteristic: Approximately 100 H simulated inductance shunted by 100 k Ω resistance. Negligible bridging loss over full measurement frequency range.

Large signal ac characteristic: At 23 mA dc, max signal voltage without clipping is approximately 4.5 volts peak. (+10.5 dBm, 900 Ω SEND level, assuming matched termination.) Signal limit increases for shorter loops.

NOTE: The electronic hold circuit is designed for use with 48 volt and 24 volt circuits. Because it requires a minimum of six to eight volts tip-to-ring, it will not operate satisfactorily with six volt battery circuits, such as AML carrier subscriber terminal units.

NOTE: The hold dc current is always less than the LOOP mA reading, which is a measurement of the current in a 200 ohm resistor. Hold current will be 23 mA if the LOOP mA reading is 24 mA in a loop with 48 volt battery, or 25 mA with 24 volt battery.

2.4 General

2.4.01 Battery Operation: Two 9-volt batteries, type Eveready 276, Burgess D6, etc.

2.4.02 Battery life expectancy: Approximately 250 hours at 4 hours per day for T262B; 200 hours for T263B.

2.4.03 On-Off switch interlock on cover to prevent battery drainage when set is not in use.

2.4.04 External Power: 48V dc ±10% between T & S of a 310 plug.

2.4.05 Size: 8-3/4" H x 12" W x 8" Deep (including cover)

2.4.06 Weight: Standard unit: 12 pounds

With optional cover: 16 pounds

2.5 Environmental

2.5.01 Operating Temperature: 0-50° C

2.5.02 Humidity: 95% at 35° C

40% at 50° C

2.5.03 Storage Temperature: -55° C to +70° C

2.5.04 Altitude (non-operating): 50,000 ft.

2.6 Optional Cover Oscillator

2.6.01 Frequency Range: Continuously variable 50 Hz to 20 kHz in three ranges.

50 Hz to 1 kHz
200 Hz to 4 kHz
1 kHz to 20 kHz

2.6.02 Frequency Display:

Output Level
Level Control
Level Calibration
Level Stability
Output Impedance
Test Termination

Same as SEND SECTION of the T262B/T263B through external oscillator jack.

2.6.03 Total Harmonic Distortion:

>50 dB below fundamental (100 Hz to 20 kHz at 0 dBm.)

>40 dB below fundamental full range.

3.0 PANEL CONTROLS AND CONNECTIONS

3.1 General

3.1.01 This section describes the function of each switch, control and connector located on the front panel of the Model T262B/T263B Test Set.

3.1.02 The section is sub-divided into sections relating to power, common use, sending tones, common measurement controls, function and weighting controls.

3.1.03 Figure 3-1 will identify the items of the text by the designation numbers appearing on the schematic diagrams. The numbering is determined by physical assembly rather than functional operation. For example, S2 and S5 identify multiple function switches.

3.1.04 Pushbutton action definitions:

(1) Push-push: The switch remains in when pressed and must be pressed again to release. The switch function continues as long as the switch remains in.

(2) Interlocking: Consists of a group of two or more switches. When any switch in a group is pushed, it automatically releases any other switch that was in. The switch function continues until released by pushing another switch in that group.

(3) Interlocking with lockout: Has the same effects as the interlocking action except that no two interlocking buttons may be pressed at one time.

(4) Momentary: The switch remains in only as long as it is pressed. The switch returns to its original position as soon as pressure is removed.

3.1.05 Pushbutton Color Code

(1) RED — Noise Circuits

(2) GREEN — 600 ohm, 900 ohm IMPEDANCE Circuits

(3) WHITE — BATT TEST, CAL SEND, TEST TERM SEND, AND DIAL

(4) BLACK — Remaining Functions

3.2 Power Related Controls and Connections

3.2.01 POWER Switch — This two position toggle switch (S1), located in the lower right corner of the panel, applies power to the Test Set. Application of power may be verified by performing

the BATT TEST check.

3.2.02 C.O. BATT Jack — This 310 type jack (J17), located in the lower right corner of the panel, is used to power the Test Set with the 48V dc office battery.

NOTE: When applying C.O. BATT power, plug into the Test Set first and then into the frame.

3.2.03 BATT TEST — This momentary action pushbutton, part of S5, connects the meter to a battery test circuit and produces a meter deflection proportional to the voltage on the lower of the two batteries. When using the C.O. BATT jack, a meter indication in the GOOD BATT portion of the scale will verify application of 48V dc to the Test Set.

3.3 Common Controls and Connections

3.3.01 LINE Connections — Two lines may be connected to the T262B/T263B Test Set by several methods. The two lines are designated LINE A and LINE B. The connections are located along the bottom edge of the Test Set. Connections may be made with hookup wire, spade lugs or banana plugs to the binding posts provided and designated T & R and GND. Line connections may also be made using cords terminated in 310 plugs.

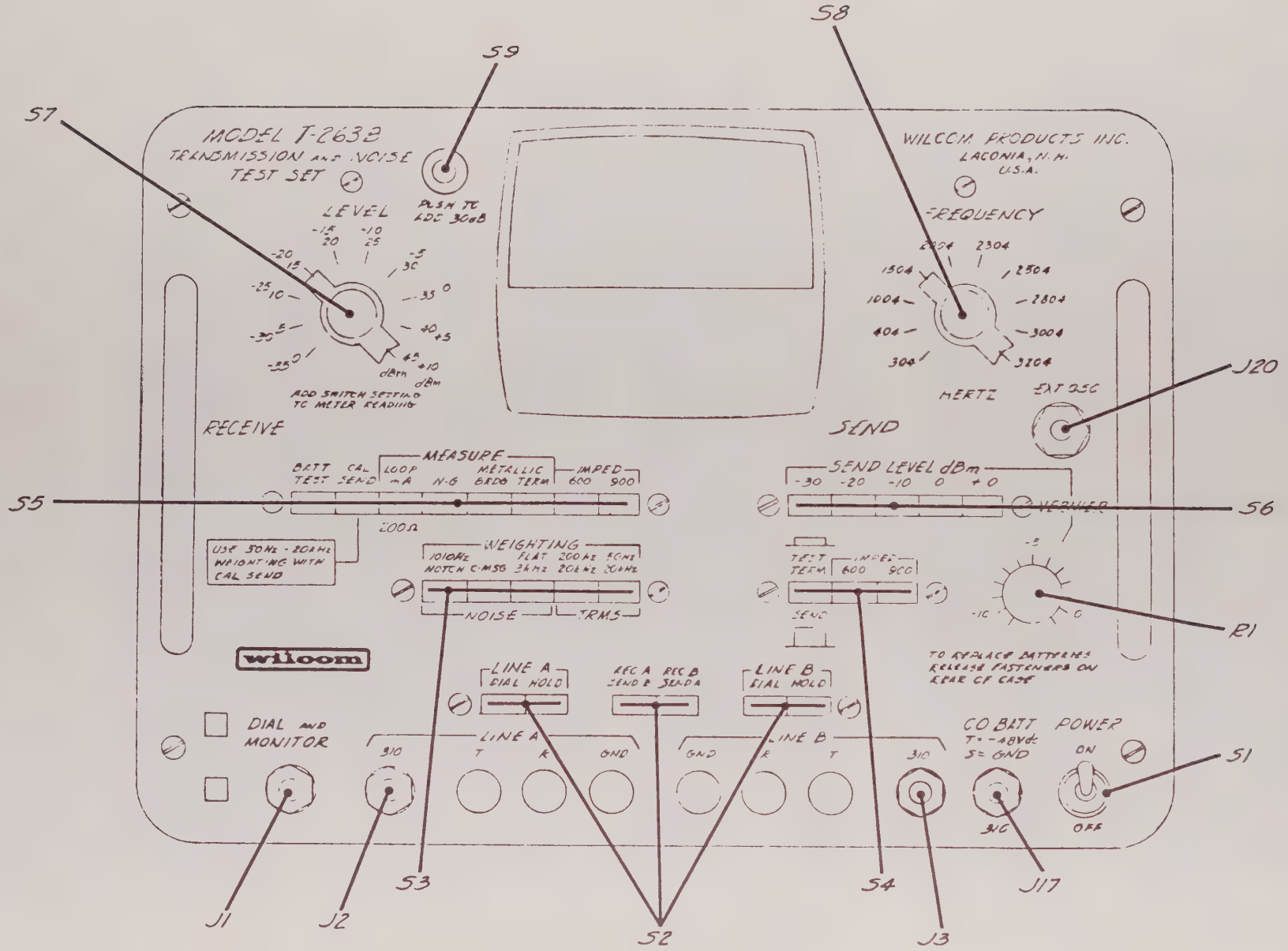
3.3.02 LINE A — These two push, push action pushbuttons, DIAL & HOLD, (part of S2) located above the LINE A connections, control the dial and hold functions for the associated line terminals. Pushing DIAL connects the line terminals to the DIAL and MONITOR posts and 310 jack. Pushing HOLD activates the electronic hold circuit and draws dc current to hold the line after the desired number has been dialed. The HOLD switch must be released to dial a line and must be pressed to hold the line before the DIAL switch is released.

3.3.03 LINE B — These two push, push action pushbuttons, part of S2 located above the LINE B connections, control the dial and hold functions for the associated line terminals as described in the preceeding section.

3.3.04 REC A/SEND B - REC B/SEND A — These two interlocking action pushbuttons, part of S2 located above the line terminals perform the connection of the line or lines under test to the send or receive section of the Test Set.

3.3.06 DIAL and MONITOR — Two square metal posts and a jack (J1) are located in the lower left corner of the front panel. The dial posts or 310 jack allow connection of a lineman's telephone test set for dialing purposes on LINE A or B when the appropriate DIAL pushbutton is pushed. When both DIAL pushbuttons are released, the dial posts and jack allow listening to the signal being received without interfering with the measurement.

3.4 Controls Related to Sending Tones



MODEL T263B
CONTROL AND CONNECTOR DESIGNATIONS

Fig. 3-1

3.4.01 FREQUENCY HERTZ — This switch, (S8) located in the upper right portion of the panel, selects one of the ten SEND frequencies.

3.4.02 EXT OSC Jack — This 310 jack (J20), located below the FREQUENCY-HERTZ switch allows connection of the Model T287 Oscillator Cover Option to provide a variable frequency (50 Hz -20 kHz) capability for the T262B/263B.

3.4.03 SEND LEVEL dBm — These five interlocking action pushbuttons, (S6) located below the FREQUENCY switch, select the 10 dB step level adjustment range of the SEND LEVEL VERNIER control. Calibration is such that the selected pushbutton indicates the level associated with the vernier control zero index.

3.4.04 SEND LEVEL VERNIER — This control, (R1) located below and to the right of the SEND LEVEL dBm pushbuttons, provides 12 dB of continuous level adjustment, -11 to +1 dB with respect to pushbutton selection.

3.4.05 IMPED 600 and 900 — These two interlocking action pushbuttons, (part of S4) located below the SEND LEVEL dBm pushbutton, select the sending impedance of 600 or 900 ohms.

3.4.06 TEST TERM — When pushed to latch, this push-push action pushbutton, (part of S4) located below the SEND LEVEL dBm pushbuttons, switches a resistive termination, selected by IMPED pushbuttons, plus 2.16 uF across the send terminals in place of the generator. When in the released position, the generator is connected to the sending line terminals of the Test Set.

3.4.07 CAL SEND — This interlocking action pushbutton, (part of S5) located below and to the left of the meter, connects the measuring circuit input to the output of the SEND amplifier prior to the impedance selection circuits. The SEND signal may then be monitored without affecting the output level or impedance.

3.5 Common Measurement Controls

3.5.01 General — This section describes those controls that are related to all ac measuring functions of the T262B/T263B.

3.5.02 IMPED:600, 900 — These two interlocking pushbuttons, part of S5, select both the value of the terminating resistor and also the nominal circuit impedance for which the measuring circuits are calibrated.

3.5.03 LEVEL Switch — This 10 position rotary switch (S7), located to the left of the meter, provides 5 dB attenuation steps for N-G (Noise-to-Ground) or METALLIC (Transmission or Circuit Noise) measurements over the following ranges:

Transmission	+11 dBm to -44 dBm (black scale)
Noise Metallic	0 dBrn to 55 dBrn (red scale)
Noise-to-Ground	40 dBrn to 95 dBrn (red scale)

3.5.04 PUSH TO ADD 30 dB — This momentary action switch (S9), located above the LEVEL switch, reduces the internal circuit gain by 30 dB, so that 30 dB must be added to the meter reading and LEVEL switch setting. It is used for measuring noise levels which would otherwise be off scale.

3.5.05 Meter — The meter provides four measuring scales and a good battery indicating area. For transmission measurement a scale is calibrated from +1 dBm to -9 dBm; for noise metallic measurements a scale is calibrated from 0 to 10 dBrn; for noise-to-ground measurements a scale is calibrated from 40 dBrn to 50 dBrn; the received level is the algebraic sum of the LEVEL switch setting and the meter reading. Loop mA measurements are indicated on a 0 to 100 mA linear scale.

3.6 Function Selection Controls

3.6.01 One of the six pushbuttons related to selecting the operating mode of the test set must be engaged. The BATT TEST pushbutton (see section 3.2.03) is momentary. The remaining five are interlocking and operate as follows:

3.6.02 CAL SEND — This interlocking action pushbutton, (part of S5) located below and to the left of the meter, connects the measuring circuit input to the output of the SEND amplifier prior to the impedance selection circuits. The SEND signal may then be monitored without affecting the output level or impedance.

3.6.03 MEASURE:LOOP mA — This pushbutton, part of S5, connects the LINE input through a diode bridge directly to the meter shunt for measuring dc current, without regard to polarity, which a line connected to the Test Set would supply to a 200 ohm resistive load.

3.6.04 MEASURE:N-G (Noise-to-Ground)— This pushbutton, part of S5, connects the LINE input to an impedance of 200 k ohms to each side of the line and ground for measuring longitudinal ac voltage (between both sides of the line taken together and ground) on the dBrn scale (0 dBrn = 24.5 μV). The LEVEL switch WEIGHTING circuits are operative.

3.6.05 MEASURE:METALLIC:BRDG, TERM — These two interlocking pushbuttons, part of S5, select the input impedance that is connected to the LINE inputs for all functions except DIAL and LOOP mA. The TERM pushbutton connects a dc blocked terminating resistor across the line. The BRDG pushbutton disconnects this resistor to provide a high impedance. When either pushbutton is engaged, the set is connected for making measurements in the metallic circuit; that is, between T and R terminals of the LINE input.

3.7 WEIGHTING Pushbuttons

3.7.01 These pushbuttons (S3) select the frequency response characteristics for all ac measurements. One pushbutton must be engaged. The Model T262B has four interlocking push-buttons, while the Model T263B has the additional push-push action NOTCH pushbutton.

3.7.02 NOISE:C-MSG, FLAT 3 kHz — These two pushbuttons also set the internal circuit gain for use with the dBrn graduations on the LEVEL switch, and select a quasi-rms detector characteristic in the meter circuit.

3.7.03 TRMS:200Hz - 20kHz, 50Hz -20kHz — These two pushbuttons also set the circuit gain for use with the dBm graduations on the LEVEL switch, and select an average-responding detector characteristic.

3.7.04 1010Hz NOTCH — This pushbutton selects circuitry to attenuate any tone between 995Hz and 1025Hz by at least 50 dB (T263 only).

3.8 Accessory Controls, Cover Options

3.8.01 This section describes the function of each switch, control and connector located on the Optional Accessory Cover Panels. Figure 3-2 will identify the items of the text.

3.8.02 The section is divided into subsections relating to power, a TALK CIRCUIT and a continuously variable OSCILLATOR.

3.8.03 Cover Option Power Supply — The T287 Cover Options may be powered from four internal "D" cells located under the T262B/T263B Accessory Cover Central Panel, or from 48V Central Office battery where available.

3.8.03.01 310 C.O. BATT jack — This 310 jack is a connector for using 48V C.O. battery as a power source. It also is a switch for disconnecting the four internal "D" cells when C.O. battery is connected.

3.8.04 T287 TALK CIRCUIT — This subsection describes those switches and connections located on the panel of the DIAL and TALK CIRCUIT Cover Option.

3.8.04.01 TALK LINE, ON HOOK/OFF HOOK switch (S3):

a. ON HOOK — No connections are made to the talk circuit.

b. OFF HOOK LINE — In this position, the talk circuit is powered by the line voltage.

c. OFF HOOK LOCAL BATT — In this position, the talk circuit is powered from the internal "D" cells.

3.8.04.02 TALK LINE:310 jack; T, R binding posts — The 310 jack (J1) and the binding posts labeled T, R connect the accessory TALK CIRCUIT to an outside line.

3.8.04.03 TO DIAL AND MONITOR JACK ON T262/T263 (J2) — Connects with the DIAL AND MONITOR jack on the T262B/T263B.

3.8.04.04 T262/T263/TALK LINE — This switch (S2) determines the connection of the talk circuit.

(1) Through the DIAL AND MONITOR circuit of the T262/263.

(2) Directly to the talk line of the cover option.

3.8.04.05 52/53 TYPE HEADSET — Dual jack J3 and J4 for standard 52/53 telephone headset or equivalent.

3.8.05 T287 OSCILLATOR — This subsection describes those switches and connections located on the panel of the OSCILLATOR cover option.

3.8.05.01 RANGE Switch (S1) — Selects the frequency range of the TUNE control.

(1) 50 Hz - 1 kHz

(2) 200 Hz - 4 kHz (voice frequency band)

(3) 1 kHz - 20 kHz

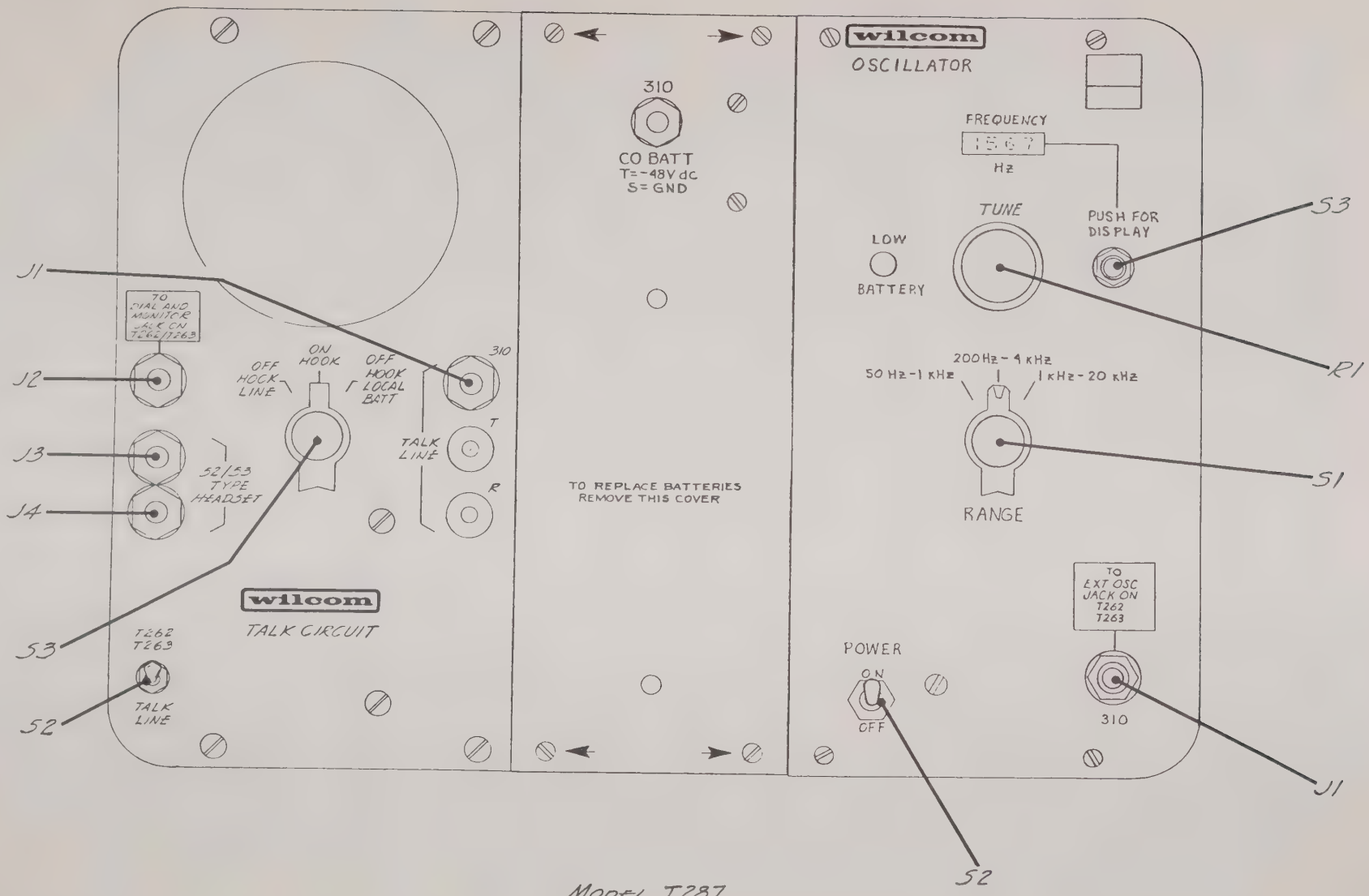
3.8.05.02 TUNE (R1) — Tuning dial for continuously variable oscillator.

3.8.05.03 POWER — Switch ON/OFF (S2).

3.8.05.04 TO EXT OSC JACK ON T262/T263 (J1) — Connects accessory cover continuously variable oscillator to T262/263 Test Set.

3.8.05.05 PUSH FOR DISPLAY (S3) — Illuminates FREQUENCY Hz digital display when pressed.

3.8.05.06 LOW BATTERY "LED" (DS1) — Glows red when internal battery is low or when C.O. Battery is low.



MODEL T287
COVER OPTIONS

Fig. 3-2

4.0 OPERATING INSTURCTIONS

4.1 Power

4.1.01 The T262B/T263B Test Sets are powered by two 9 volt primary batteries. Power is supplied to the set by operating the POWER switch to ON.

4.1.02 The condition of the batteries may be determined by holding the BATT TEST pushbutton in with the POWER switch in the ON position. A meter reading in the GOOD BATT portion of the scale, or an off-scale high reading, will indicate that there is sufficient battery voltage to operate the test set.

4.1.03 If the meter does not read in the GOOD BATT area, the batteries should be replaced in accordance with instructions under Section 6.0 MAINTENANCE — TROUBLE LOCATING.

4.1.04 The Test Sets are also capable of being powered by 48V dc office battery applied between the tip and sleeve of a 310 type jack.

4.1.05 Application of 48V dc to the Test Set may be verified by pushing the BATT TEST pushbutton and observing a meter indication in the GOOD BATT portion of the scale.

NOTE: When using 48V dc office battery to power the Test Set, connect the power cord to the T262B/T263B first and then connect to the 48V dc source.

4.2 Ground

4.2.01 Noise-to-Ground measurements require the connection of the Test Set GND terminal to a "good" ground in order to obtain meaningful measurements. The ground may alternately be provided thru the sleeve of the LINE 310 jacks.

4.2.02 Normally all measurements are made with the Test Set grounded. However, if it is necessary to measure low metallic noise levels in the presence of high longitudinal noise levels - exceeding the longitudinal balance of the set - it is possible to obtain meaningful measurements by "floating" or not grounding the Test Set.

4.2.03 When using 48V dc office battery to power the T262B/T263B Test Set, ground may be provided thru the sleeve of the 310 jack or the line connection GND terminals.

4.3 Dial and Hold

4.3.01 Application of power to the Test Set is not required. To dial and hold a line:

a. Connect the line to the desired line terminals on the Test Set, LINE A or LINE B.

b. Push the DIAL pushbutton for the associated line terminals.

c. Connect a lineman's test telephone to the dial posts or 310 jack, DIAL and MONITOR, and dial the required test number.

d. After reaching the test number, push the HOLD pushbutton for the associated line terminals. Push to release the DIAL pushbutton.

e. The connection will now be held until released by pushing to release the HOLD pushbutton.

4.3.02 If both DIAL buttons are pressed, only LINE A will be connected to the DIAL AND MONITOR jack and terminals. If neither DIAL button is pressed, the DIAL AND MONITOR jack and terminals are connected to a circuit which permits listening to the signal being measured. (If neither switch is operated, both lines will be connected to the send circuits.)

4.4 Measuring Loop Current

4.4.01 Following the Dial and Hold instructions of Section 4.3, dial the number of the milliwatt generator or the quiet termination in the C.O. After the connection has been established, the loop current may be measured.

4.4.02 Push either the REC A/SEND B or the REC B/SEND A pushbutton to connect the receive measuring circuits to the line terminals being used.

4.4.03 Push the MEASURE - LOOP mA pushbutton and read the loop current into 200 Ω on the 0 to 100 LOOP mA meter scale.

4.5 Sending Tones — Setting and Calibration

4.5.01 Push the CAL SEND pushbutton. This action connects the measuring circuit input to the output of the SEND amplifier prior to the impedance selection circuits. The SEND signal may then be monitored without affecting the output level or impedance.

NOTE: The normal interlocking between the CAL SEND pushbutton and the four MEASURE pushbuttons provides

automatic releasing when a new pushbutton is pushed. If it is desirable to provide a termination for the RECEIVE line while using the CAL SEND function, both the MEASURE METALLIC TERM and the CAL SEND pushbuttons may be physically pushed simultaneously. This is the ONLY time the single pushbutton interlocking actions should be defeated.

4.5.02 Push the 50 Hz - 20 kHz WEIGHTING pushbutton.

4.5.03 Set the RECEIVE LEVEL attenuator to indicate the desired send level on the meter. Use the BLACK calibration scales to set the RECEIVE LEVEL attenuator. The level indication is the algebraic sum of the attenuator setting and the meter indication.

4.5.04 Select one of the ten fixed SEND frequencies provided by the FREQUENCY - HERTZ rotary switch.

4.5.05 Push the suitable 10 dB SEND LEVEL pushbutton and adjust the SEND LEVEL VERNIER control to obtain a meter indication of the desired send level.

4.5.06 Push the desired SEND IMPED pushbutton. Select either 600 or 900 to correspond to the nominal impedance of the device or line being tested.

4.5.07 Verify that the TEST TERM/SEND pushbutton and the DIAL pushbutton for the desired send line are released.

4.5.08 Push either the REC A/SEND B or the REC B/SEND A pushbutton to connect the SEND signal to the desired line terminals.

4.6 Measuring Received Tone Levels

4.6.01 Push either the REC A/SEND B or the REC B/SEND A pushbutton to connect the RECEIVE circuits to the desired line terminals.

4.6.02 Push one of the two WEIGHTING/TRMS pushbuttons. Select either 50 Hz - 20 kHz or 200 Hz - 20kHz. The 200 Hz - 20 kHz weighting will attenuate 60 Hz signals at least 30 dB.

4.6.03 Push the desired IMPED pushbutton. Select either 600 or 900 to correspond to the nominal impedance of the device or line being measured.

4.6.04 Push one of the two MEASURE METALLIC pushbuttons. Select BRDG for a high test set impedance when there is an external termination or TERM when the Test Set is to provide the terminating impedance.

4.6.05 Adjust the RECEIVE LEVEL attenuator for an on-scale meter reading. The received level in dBm will be the algebraic sum of the attenuator setting, BLACK scale, and the meter reading on the -9 dBm to +1 dBm TRANSMISSION LEVEL scale.

4.7 Measuring Circuit Noise and Noise-Ground

4.7.01 To make circuit noise measurements, the procedures for measuring received tones (Section 4.6) are followed with the following differences.

4.7.02 Push one of the two WEIGHTING/NOISE pushbuttons. Select either C-MSG or FLAT 3 kHz.

4.7.03 When measuring circuit noise, the dBrn scale (inner, RED) of the LEVEL attenuator is used with the red 0 to 10 dBrn NOISE METALLIC meter scale.

4.7.04 To make noise-to-ground measurements verify the Test Set ground is connected to a "good" ground and push the MEASURE/N-G pushbutton. The sum of the LEVEL attenuator setting (inner, RED scale) and the meter reading on the 40 to 50 dBrn NOISE TO GROUND scale is the noise-to-ground in dBrn, where zero dBrn is 24.5 microvolts (600 ohm voltage equivalent).

4.7.05 The measurement range of the Test Set may be extended 30 dB by pushing the PUSH TO ADD 30 dB pushbutton. While holding the button, add 30 to the setting of the LEVEL attenuator to measure circuit noise (METALLIC) between 55 dBrn and 85 dBrn or noise-to-ground (N-G) between 95 dBrn and 125 dBrn.

4.8 Measuring Noise with Tone

4.8.01 To make noise measurements in the presence of a holding tone using the T263B Test Set, the procedures for measuring noise (Section 4.7) are followed with the following additions.

4.8.02 Push the 1010 Hz NOTCH pushbutton. The notch filter will attenuate any tone between 995 Hz and 1025 Hz by at least 50 dB.

CAUTION: ATTEMPTS TO MEASURE NOISE LEVELS MORE THAN 50 dB BELOW THE RECEIVED HOLD TONE LEVEL ARE NOT LIKELY TO GIVE MEANINGFUL RESULTS. Example: A received hold tone level of -10 dBm prevents noise measurements below 30 dBrn.

4.9 Test Termination

4.9.01 Pushing to latch the TEST TERM pushbutton removes the generator from the SEND terminals of the Test Set and substitutes 600 or 900 ohms, as selected by the SEND IMPED, plus 2.16 μF as a termination.

4.9.02 Pushing to release the pushbutton, TEST TERM, returns the generator to the SEND terminals of the Test Set.

4.10 Accessory Cover Options Operating Instructions

4.10.01 Power

4.10.01.01 The T287 Accessory Cover Options are powered by 4 "D" batteries (1.5V each). Power is supplied to the circuits by operating the POWER switch to ON.

4.10.01.02 When using the oscillator cover option, the condition of the batteries may be determined by observing the LOW BATTERY "LED". If the lamp is glowing red, replace the batteries under the center panel.

4.10.01.03 The batteries should be replaced in accordance with instructions under Section 6 MAINTENANCE—TROUBLE LOCATING.

4.10.01.04 The Accessory Cover circuits also are capable of being powered by the tip and sleeve of a 310 type jack on the center panel labeled 310/CO BATT. This jack disconnects the internal batteries when 310 plug is inserted.

NOTE: When using 48V dc C.O. battery to power a test set, connect the power cord to the T287 power supply panel first and then connect to the dc source.

4.10.02 Dial and TALK CIRCUIT Cover Option

4.10.02.01 A conventional dial and talk circuit and a test circuit can be set up simultaneously using the T262B/263B in conjunction with the T287-01 TALK CIRCUIT Cover Option.

4.10.02.02 TALK CIRCUIT — In order to use the TALK CIRCUIT the ON HOOK/OFF HOOK switch beneath the dial must be in one of two positions — either OFF HOOK LINE or OFF HOOK LOCAL BATT depending on the source of power available to operate the circuit. With the TALK CIRCUIT function switch in the OFF HOOK LINE position, C.O. battery supplies the power. If C.O. battery power is not available, the function switch should be in the OFF HOOK LOCAL BATT position for internal battery operation.

4.10.02.03 The T287-01 Talk Circuit is for use with a 52 or 53 type headset.

4.10.02.04 The T262/T263/TALK LINE switch enables the user to establish a talk circuit while obtaining test information with the T262/263 TEST SET on another line. This is accomplished by patching the T287 TALK CIRCUIT to the T262/263 by means of the TO DIAL AND MONITOR JACK on the T287 and the DIAL AND MONITOR jack on the T262/263. Connection is made to the test line through the LINE A, LINE B connections on the T262/263. Talk line connections are made through the TALK LINE 310 jack or T and R binding posts on the T287 TALK CIRCUIT. Access to one line or the other can now be made by using the T262/T263 — TALK LINE switch on the lower left corner of the T287 talk circuit.

4.10.02.05 A 200 ohm resistor is connected across the TALK LINE when S2 is in the T262/T263 position to prevent dropping the line.

4.10.03 OSCILLATOR

4.10.03.01 T287-02 OSCILLATOR control is obtained using the frequency RANGE switch, the tuning dial labeled TUNE and the FREQUENCY Hz digital display. Digital readout of the frequency of the oscillator permits precise setting of the desired frequency for analytical work involving filters and frequency response.

4.10.03.02 Level Control for the Variable Frequency Oscillator is obtained by means of the SEND LEVEL dBm control on the T262B or T263B Test Set through the EXT OSC jacks on both pieces of equipment.

4.10.03.03 Connections between the POWER, ON/OFF switch on the "TO EXT OSC JACK ON T262/T263" are such that a plug has to be in the 310 jack before the POWER, ON/OFF switch can turn the set on. This eliminates battery drainage if the POWER switch is left on when the 310 plug is removed.

5.0 CIRCUIT DESCRIPTION

5.1 General

5.1.01 Figure 5-1 is a detailed block diagram showing the individual circuit boards and all interconnections. This diagram can be useful in following the circuit descriptions; therefore, it is an aid to locating and isolating trouble. Figure 5-2 shows in tabular form the signal levels which appear at various points in the circuits. Levels shown for transmission and noise measurement are the lowest which will give an on scale meter reading.

5.1.02 The electronic circuits of the T262B and T263B are contained on printed circuit boards which are mounted on the rear of the instrument panel. Solid state circuits are used throughout; therefore, widespread use is made of active circuits for frequency processing. Very low power integrated circuit amplifiers are used in order to provide long service life with low-cost disposable batteries.

5.1.03 Section 5.2 through 5.10 are an overall description of the circuits; these can best be understood by following the block diagram of Figure 5-1.

5.2 Hold and Line Select Circuits

5.2.01 The LINE A, LINE B, and DIAL AND MONITOR jacks and terminals of the T262B and T263B are connected to Printed Circuit Assembly A1, which contains the HOLD and LINE SELECT circuits. The tip and ring connections from LINE A and LINE B pass through 25 ohm resistors to a lightning protection varistor RV101 or RV102 to the DIAL switches, S2A, or S2E. When either of these switches is operated by pressing in its pushbutton, the corresponding line is connected to the DIAL AND MONITOR jack and terminals. The DIAL circuit permits a lineman's telephone to be used to dial a quiet termination on either line. If both DIAL buttons are pressed, only LINE A will be connected to the DIAL AND MONITOR jack and terminals. If neither DIAL button is pressed, the DIAL AND MONITOR jack and terminals are connected to a point in the meter circuit (A2) which permits listening to the signal being measured.

5.2.02 Electronic hold circuits are also connected across each line through the HOLD switches, S2B and S2F. Each hold circuit comprises a diode bridge and four transistors. When the Test Set is connected to a short telephone loop, the hold circuit acts as a constant current load at approx. 35 milliamperes dc with very high ac impedance. If the circuit loop resistance is too high to provide 35 mA dc, the hold circuit acts like a dc resistor of approximately 200 ohms in series with a very high value simulated inductor. Thus the hold circuit causes negligible bridging loss, even at the lowest measurement frequencies. Each line, when its DIAL switch is released, passes through another pair of 25 ohm resistors in dc current sensing circuits. When a LOOP mA measurement is made on either line, the dc loop current passing

through one of these resistors, depending on dc polarity, is sensed and causes the hold circuit to be disabled. Thus, all the dc loop current will flow through the meter bridge circuits and not through the hold circuits when loop current measurements are being made.

5.2.03 The two lines next pass to the line select switches S2C and S2D which are designated respectively REC A/SEND B and REC B/SEND A. These two switches are mechanically interlocked so that either one is automatically released when the other is pressed. (If neither switch is operated, both lines will be connected to the send circuits.)

5.3 Measure Switching

5.3.01 The line selected for receive is connected from J8 of Assembly A1 to J11 of the measure switching circuits in Assembly A3. These circuits contain eight pushbutton switches used to determine the type of measurement which is to be made.

5.3.02 The BATT TEST pushbutton, S5A, is a momentary switch which connects the meter to a battery test circuit and produces a meter deflection proportional to the voltage on whichever of the two batteries is the poorer. The battery test circuit is described in Section 5.10.02.

5.3.03 The next five switches in this group are mechanically interconnected in a latching arrangement, since selection of one of them will determine the type of measurement to be made. The CAL SEND pushbutton switch, S5B, connects a signal from the generator section of the T262B or T263B to the measuring circuits to permit the send output level to be calibrated. As indicated on the front panel, broadband flat weighting, 50 Hz to 20 kHz, should be used when calibrating the send output.

5.3.04 The LOOP mA pushbutton switch, S5C, connects the receive line through a diode rectifier bridge and a resistor network direct to the meter. The total dc resistance between tip and ring terminals of the receive line during loop current measurement is 200 ohms, which is made up of 100 ohms in the HOLD and LINE SELECT circuits and 100 ohms in the MEASURE SWITCHING circuit. The actual measurement is of the voltage drop across 33 ohms of this 200 ohm total. The meter has a scale calibrated to read LOOP mA directly.

5.3.05 The receive signal for all measurements except loop current passes through a pair of dc blocking capacitors capable of blocking at least 300 volts dc across the balanced input terminals or from either terminal to ground.

5.3.06 The METALLIC:BRDG, TERM pushbuttons, S5E and F, connect the circuit for measurement of metallic signal or noise level on the line. In addition, the TERM pushbutton will connect a 600 or 900 ohm resistance across the line after the dc blocking capacitors.

5.3.07 The N-G (Noise-to-Ground) pushbutton, S5D, connects the signal through a 200 kilohm resistor from each side of the line (100 kilohm from both sides taken together), and an additional blocking capacitor, to a relatively low value resistive shunt to ground. A scale on the meter is calibrated to read Noise-to-Ground in dBrn when this measurement is made. Noise-to-Ground measurements are referenced to the voltage equivalent to 1 picowatt in 600 ohms, or 24.5 microvolts

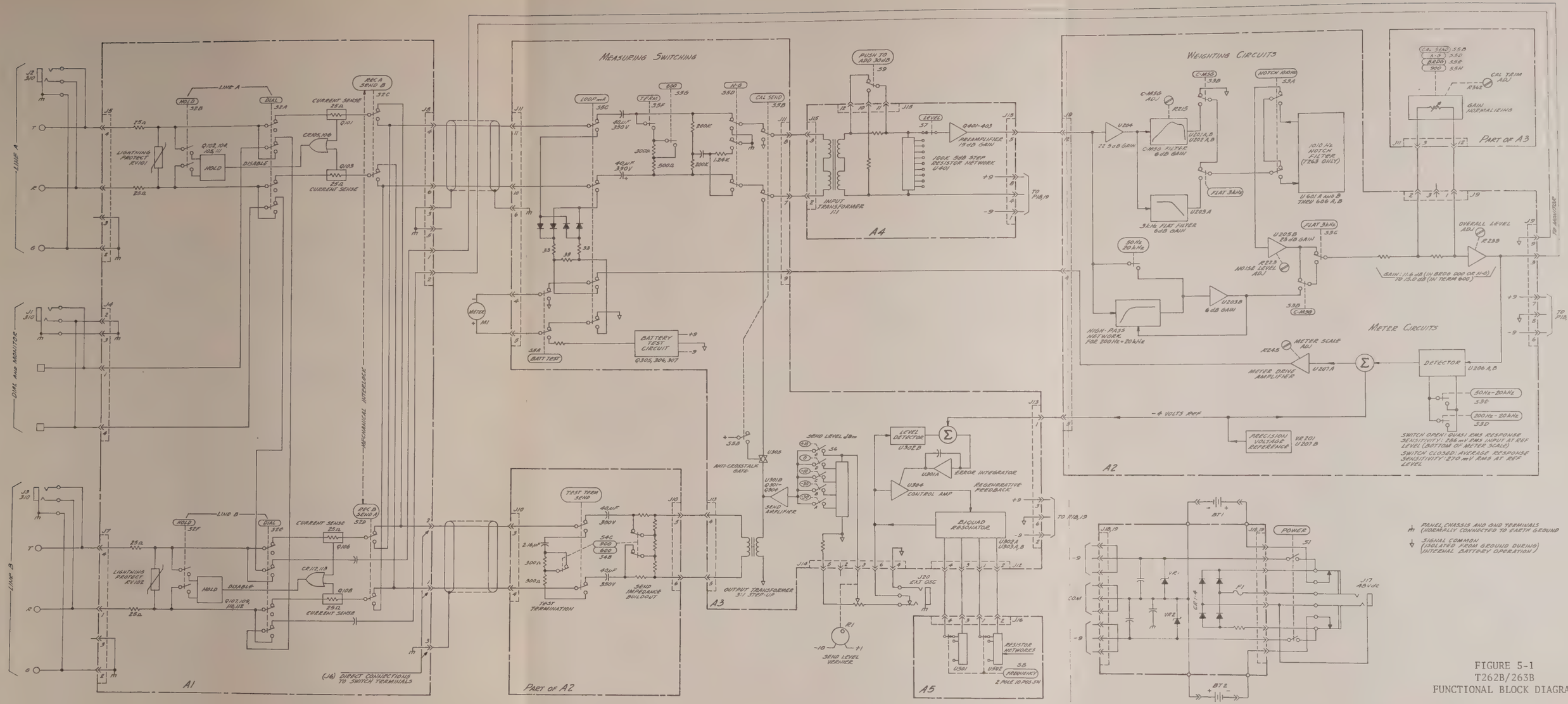


FIGURE 5-1
T262B/263B
FUNCTIONAL BLOCK DIAGRAM

RECEIVE SECTION

UNLESS OTHERWISE INDICATED,
ALL LEVELS SHOWN WITH LEVEL SWITCH IN MOST SENSITIVE POSITION (-35dBm/0dBrn)
AND METER READING AT BOTTOM OF SCALE (-9dBm, 0dBrn NOISE METALLIC, ETC)

MEASUREMENT CONDITION			INPUT LEVEL dB	INPUT LEVEL VOLTS RMS	AFTER 100Ω SERIES R IN INPUT AT JB PINS 4,6	AFTER 15.5dB PREAMP GAIN	OUTPUT U203B WEIGHTING 6dB	INPUT U205B (22.5dB GAIN U204 PLUS WEIGHTING 6dB)	U205B (23dB GAIN)	U205A GAIN MAX	U205A NOM OUT	AT CAPACITOR C218 BOTTOM OF METER SCALE	AT CAPACITOR C218 FOR METER FULL SCALE
TRMS LEVEL	900	BRDG	-44 dBm	5.99 mV	5.99 mV	35.7 mV	71.3 mV	→	→	4.36	.27V RMS	.160 Vdc	.506 Vdc
		TERM			5.32 mV	31.7 mV	63.4 mV	→	→	4.91			
	600	BRDG		4.89 mV	4.89 mV	29.1 mV	58.3 mV	→	→	5.30			
		TERM			4.08 mV	24.3 mV	48.6 mV	→	→	6.44			
NOISE METALLIC	900	BRDG	0 dBm	30.0 μV	30.0 μV	179 μV	→	4.8 mV	67.2 mV	4.36	.25V RMS		
		TERM			26.7 μV	159 μV	→	4.2 mV	59.7 mV	4.91			
	600	BRDG		24.5 μV	24.5 μV	146 μV	→	3.9 mV	54.8 mV	5.30			
		TERM			20.4 μV	122 μV	→	3.2 mV	45.7 mV	6.44			
N-G			40 dBrn	2.50 mV	AFTER R309-R310 30.0 μV	179 μV	→	4.8 mV	67.1 mV	4.36			
CAL OUT			-24 dBm	TI PRI. 39.7mV	ATTEN OUT AT -15 dBm 3.97 mV	23.7 μV	47.3 mV	→	→	6.27	.27V RMS		

SEND SECTION

		TERMINATED OUTPUT	OPEN CKT OUTPUT	TRANSFORMER PRIMARY	U301B INPUT	J14-3	J14-6
0 dBm	600	.775 V RMS	1.55 V	.632V	.238 V	.753 V	.89V RMS
	900	.949 V RMS	1.90 V				
-24 dBm	600	48.9 mV	97.7 mV	39.9mV	15.0mV	.474 V	
	900	59.9 mV	119.7 mV				

SIGNAL LEVELS

Fig. 5-2

regardless of the actual or nominal impedance of the circuit on which the measurement is made.

5.3.08 The IMPED:600,900 pushbutton switches, S5G and H, are mechanically interlocked with each other but not with the other switches in the group. They select the value of resistance connected across the line by the TERM switch. This is either 500 or 800 ohms which, together with the 100 series ohms in the hold and line circuits, gives the required total of 600 or 900 ohms terminating impedance. The impedance switches also select the reference level for metallic measurements in a manner which will be described later. The reference level for 0 dBm is the voltage which will produce 1 milliwatt in the selected impedance. Thus, 0 dBm 600 ohms is .775 volts while 0 dBm 900 is .949 volts.

5.4 Preamplifier

5.4.01 From the measure switching circuits, the signal to be measured passes from connector J11 to the primary of the input transformer in preamplifier Printed Circuit Assembly A4 at J15. The secondary of the input transformer is connected to an attenuator network, U401, which has ten output positions in 5 dB steps. Pressing momentary pushbutton switch S9, designated PUSH TO ADD 30 dB, inserts an additional 30 dB attenuator in the circuit. The desired output of the attenuator network is selected by the LEVEL switch. The selected attenuator output is connected to a low noise preamplifier consisting of transistors Q401-Q405 and having a gain of approximately 15 dB.

5.5 Weighting Networks

5.5.01 Signal from the preamplifier output at J15 passes to the weighting circuits in Printed Circuit Assembly A2 at connector J9. The weighting circuits are divided into two groups, one for measuring noise in dBrn and the other for measuring transmission level in dBm.

5.5.02 During transmission level measurement (TRMS) the signal from the preamplifier passes through the high-pass, 3 pole, active filter when the 200 Hz -20kHz button (S3D) is engaged, or through a bypass around this filter if the FLAT 50 Hz - 20kHz button (S3E) is engaged, and then to amplifier U203B which has a gain of approximately 6 dB. During noise level measurements the signal passes through one of two weighting circuits, each of which has a gain of 6 dB. However, for noise metallic measurement, an additional 46 dB of sensitivity is required as may be seen by examining the graduations on the front panel LEVEL attenuator switch and meter scale. This extra sensitivity is provided in noise preamplifiers U204 (preceeding the noise weighting circuits) which has a gain of 22.5 dB and in amplifier U205B (following the noise weighting circuits) which has a gain of approximately 23.5 dB, so that the total noise circuit gain is 46 dB greater than the transmission level circuit gain.

5.5.03 When the FLAT 3 kHz pushbutton (S3C) is engaged, the output of amplifier U203A provides the filtered unweighted noise signal. The filter consists of a two pole Butterworth with 12 dB per octave rolloff and a 3 dB point at 3 kHz. The C-Message weighted noise measurement filter is provided by a complex multi-pole active filter circuit

when the C-MSG pushbutton (S3B) is engaged. The filter includes a level adjustment so that the gains of all weighting circuits can be equalized. In addition, the C-MSG filter includes a selected capacitor for mid-frequency response trimming.

5.5.04 The 1010 Hz NOTCH pushbutton (S3A), present only in the T263B introduces an active notch filter circuit. S3A is a push on-push off switch not interlocked with the weighting switches; however, it is effective only when one of the noise weightings is selected. The notch filter consists of three stagger-tuned "Bi-Quad" band reject filter sections using a total of twelve operational amplifiers, or six integrated circuit packages. The notch filter rejects frequencies between 995 and 1025 Hz by at least 50 dB while attenuating signals below 862 Hz and above 1182 Hz by less than 3 dB.

5.6 Gain Normalization

5.6.01 The weighting circuits output passes to the final ac amplifier, U205A. In the input of U205A is a gain setting network linked to the CAL SEND, N-G, METALLIC, and IMPED pushbuttons. This is required because the dBm (transmission) or dBrn (noise) voltage reference levels are determined by the chosen input impedance and the difference in voltage reference levels must be compensated for in circuit gain. Similarily, a gain increase in TERM is required to compensate for the loss in the series input and current sensing resistors. In noise-to-ground measurement, however, the 0 dBrn reference level is 24.5 microvolts regardless of the impedance selection so for this reason the gain setting network is disabled if the N-G pushbutton is engaged. A gain adjustment at U205A is used in calibration to set the overall sensitivity of the Test Set. The output from U205A passes through a voltage divider to the DIAL AND ac MONITOR connector and terminal posts unless the DIAL pushbutton is pressed. It also passes to the absolute value amplifier circuit, U206B, which is part of the meter circuitry.

5.7 Meter Circuits

5.7.01 The detector consists of an absolute value circuit, U206B, followed by a combination peak and average detector U206A. During noise measurements, the circuit constants associated with U206A are such as to produce a compromise between peak and average response closely approximating a true rms response. This is referred to as a quasi-rms detector. When a transmission level weighting is selected by pushing a button S3D or S3E, the detector characteristics are modified so that it becomes average responding. The detector circuit is slightly less sensitive when average responding than when it is operating in the quasi-rms mode. The dc output of the detector circuit is compared to a -4.0 volt precision reference at the input to meter amplifier U207A to set the required signal level for 0 meter deflection. The output of the meter drive amplifier passes through a series resistor to the meter. The amplifier gain is set to produce full scale meter deflection for a signal level just 10 dB above the zero-deflection reference level.

5.7.02 A precision reference voltage is required in both the meter

circuits and the send signal generator circuits. The voltage available from partially discharged batteries in the T262B and T263B may be insufficient for proper meter operation; therefore, a low voltage integrated circuit reference VR201 is used. The -1.22 volts from the reference device VR201 is amplified in U207B and Q202 to provide the -4 volt reference. Q202 enables the reference voltage circuit to operate properly with low battery voltage.

5.8 Send Signal Generator

5.8.01 The basic oscillator circuit is a bi-quad resonator made up of integrators U303A and U303B and inverter U302A. The integrator input resistors are contained in two identical precision resistor packs, U501 and U502, with the required resistance selected by the FREQUENCY HERTZ switch. The resonator is made to oscillate by the application of a controlled regenerative feedback.

5.8.02 The output of the bi-quad resonator circuit goes to a level detector U302B whose output is compared to the same -4.0 volt precision reference used in the meter circuits. The resulting error signal is integrated and used to control the gain of Control Amplifier U304 which determines the amount of regenerative feedback. This produces a signal with a very stable output level and low harmonic distortion.

5.8.03 The oscillator output next passes through the SEND LEVEL VERNIER control R1, and the EXT OSC jack J18, to a 10 dB step attenuator network. The attenuator output is selected by pressing one of the SEND LEVEL dBm pushbuttons, S6A through S6E. The attenuator output goes to the send amplifier, made of amplifier U301B and discrete transistors Q301 through 304.

5.8.04 The output of the send amplifier goes to the output step-up transformer and the buildout circuit where the send impedance is selected by the engaged IMPED:600, 900 pushbutton. An auxiliary output from the send amplifier goes to the measure switching circuits where it is used in the CAL SEND function.

5.9 Test Termination

5.9.01 When the TEST TERM button associated with switch S4A is pressed, the generator output is disconnected from the send terminals. In its place, a test termination consisting of the selected resistance of 600 or 900 ohms in series with a 2.16 uF capacitor is connected across the terminals of the send line. This is the standard termination required for a return loss measurement.

5.9.02 The send output is next connected through a section of shielded cable to terminals of the line select switch S2C and D, and so to the front panel terminals associated with the line selected for SEND.

5.10 Power Supply

5.10.01 The power supply for the T262 consists of a pair of 9V primary batteries or a current and zener regulator for central office battery power. When -48 dc office battery is provided at the 310-type jack, the 681 ohm resistor sets the operating point for the zener diode regulators. Switch contacts associated with the C.O. BATT jack remove the batteries from the circuit when central office battery is being used to power the Measuring Set. The zener regulators provide the proper operating voltages when central office battery is being used, but do not conduct as the internal batteries discharge during use.

5.10.02 When the BATT TEST button is pressed, the output of the Battery Test Circuit is applied to the meter to indicate the capacity remaining in the lower of the two batteries. When the test circuit is operating in the linear mode, the collector of Q307 is the inverse of the negative battery voltage. When the circuit is non-linear (the positive battery is the lowest), Q307 is saturated and the positive battery is at the collector of Q307.

5.11 ACCESSORY COVER OPTIONS CIRCUIT DESCRIPTIONS

5.11.01 General — The electronic circuits of the T287 cover options are contained on printed circuit boards mounted on the rear of the panels. Low power solid state circuits are used throughout in order to provide long service life with low cost disposable batteries.

5.11.02 Power Supply Cover Option — The circuit used to drop the 48V C.O. battery to approximately 8.2V (open circuit) is basically an emitter follower — zener diode combination and series resistance along with bypass capacitance to maintain stability. The T287 Cover Options may be operated from four internal "D" cells or from 48V C.O. battery. C.O. battery voltage is applied to the tip and sleeve contacts of the 310 jack labeled C.O. BATT. See schematic drawing figure 8-17 and P.C. Assembly Figure 8-18.

5.11.03 Talk Circuit Cover Option — The Dial and Talk Cover Panel provides the telephone set circuitry for equalization, sidetone control, signaling and connection of power. An amplifier circuit provides gain to increase the transmitted signal level from the headset. The amplifier has diode protection to prevent damage due to reversed line polarity. The schematic and p.c. assembly are shown in figures 8-16 and 8-15.

5.11.04 Oscillator Cover Option — The T287-02 Oscillator is made up of two printed circuit assemblies:

a. The Oscillator Assembly which contains the frequency range switch and continuously variable tuning dial.

b. The Frequency Display Assembly mounted above the tuning dial which gives a 5 digit numerical readout when the PUSH FOR DISPLAY button is engaged.

The Oscillator Schematic is shown in Figure 8-21 and the P.C. Assembly drawing in Figure 8-20.

5.11.04.01 The basic oscillator is a biquad resonator made up of integrators U1A, U1D and inverter U1C. The tuning potentiometer R1A and R1B in conjunction with the capacitance selected by the RANGE switch (S1) determines the oscillator frequency. The oscillator output amplitude is detected in a peak detector through R21 and R22 to determine the control voltage for Q1. The amount of positive feedback through R9 and R10 and Q1 is thus controlled by R22 to an amount which is just sufficient to cause oscillation at the desired output level. This output amplitude is .89 volts rms (1.26 volts p-p).

5.11.04.02 The Frequency Counter Display measures and displays the frequency of the oscillator output. This is accomplished by applying the signal to a Phase Locked Loop (U4 and ÷ 10 counter U5) which provides frequency servoing action. The output of the Phase Locked Loop (f_o x 10) is counted for 0.1 second by 5 decade counter U6. U7 and the 6.5536 mHz crystal form the time base which supplies timing signals, multiplex rate and a 0.1 second count window. The flicker free characters are displayed on the numeric indicator DS1, Figure 8-21.

6.0 MAINTENANCE — TROUBLE LOCATING

6.1 General

6.1.01 All Wilcom Products, Inc. test equipment is warranted against defects in materials and workmanship for a period of one year from the date of delivery. Complete details of the warranty can be found on the title page of this manual.

6.1.02 Field repair of this test set is NOT recommended unless the repair will be made in a well equipped repair center. The technician performing the repair should be familiar with digital integrated circuitry, and state of the art semiconductor design.

6.1.03 In the event of troubles, it is important that the Operational Checks described in 6.2, 6.3 and 6.4 be performed BEFORE any attempts are made to repair the test set. By following this procedure, it can be determined if the problem is real or results from improper operation of the test set.

6.1.04 If the trouble cannot be found and corrected by following the procedures of 6.2 through 6.5, reference should be made to the block diagram of Figures 5-1, the circuit description of Section 5, and the detailed alignment and test procedures of 7.0. A technician with an understanding of the circuit functions should be able to trace signals and locate and repair any fault which may occur.

6.1.05 If local repair is not possible, it is suggested that the complete test set be returned for repair with information regarding the suspected trouble.

6.1.06 After any repairs not made by Wilcom Products, Inc. the test set should be re-aligned. Section 7.0 Alignment and Calibration Procedure, describes the methods and equipment required. In most cases it will not be necessary to repeat the whole of this procedure, but only applicable portions.

6.2 Operational Checks, General

6.2.01 Location of trouble within the T262B/T263B can often be expedited by making a few simple operational tests. All of these tests can be done without removing the set from its case, and without using any test equipment except patch cords and the set itself. More detailed procedures are described in section 7.0.

6.2.02 Apply power to the Test Set and verify that there is sufficient battery voltage to operate the Set - see Section 4.1. The T262B/T263B is ready to perform the checks of Section 6.3 through 6.4 to verify basic operations. If any check is not performed satisfactorily, consult Repair Procedure, Section 6.5 for aid in isolating the probable cause of trouble.

6.3 Operational Checks — Transmission Measurements

6.3.01 Following the SEND LEVEL calibration procedures given in Section 4.5 of this manual will verify proper operation. The calibration procedure should be repeated for four frequencies spaced around the switch.

6.3.02 The function switching can be verified by connecting LINE A to LINE B with a patch cord and verifying that the test set can be calibrated by setting the FUNCTION switch first to SEND A REC B position and then to the SEND B REC A position. Calibration of the test set should be possible in both positions. (Follow Sections 4.5 and 4.6 of this manual).

6.3.03 If, after performing the operational checks outlined in the previous paragraphs, the test set performs satisfactorily it can be safely assumed that the test set is operating properly when used for transmission measurements. If not, consult REPAIR PROCEDURE, Section 6.5, for aid in isolating the probable cause of trouble.

6.4 Operational Checks — Noise Measurements

6.4.01 When using the Model T262B/T263B Test Set to make noise measurements, the only additional circuits involved are the weighting networks used when making noise measurements and they may be evaluated as described in the following paragraphs.

6.4.02 The FLAT 3 kHz noise weighting network can be checked by making a relatively simple transmission test. The required response is indicated in the FLAT 3kHz portion of Section 7.0 Check Sheet.

1. Patch the LINE A terminals to the LINE B terminals.
2. Engage the MEASURE:METALLIC:TERM, SEND LEVEL -30, SEND IMPED:600, RECEIVE IMPED:600, WEIGHTING:50Hz-20kHz, and REC A/SEND B pushbuttons.
3. Set the FREQUENCY HERTZ switch to 1004.
4. Set the RECEIVE LEVEL switch to -35 dBm (black scale)
5. Adjust the SEND VERNIER for -5 dBm on the TRANSMISSION LEVEL meter scale. A -40 dBm level (50 dBrn) is being "sent" to the RECEIVE section.
6. Set the RECEIVE LEVEL switch to 45 dBrn (red scale).
7. Engage the WEIGHTING:FLAT 3kHz pushbutton.
8. The NOISE METALLIC meter scale should read 5 dBrn ±.25 dBrn.

9. Re-adjust the SEND VERNIER, if necessary, for 5 dBrn.

10. Set the FREQUENCY HERTZ switch to 3004. The NOISE METALLIC meter scale should read 1 dBrn ±1.8 dBrn.

6.4.03 The C-MSG weighting network can be checked in a manner similar to that described in paragraph 6.4.02. The required response is indicated in the C-MSG portion of Section 7.0 Check Sheet.

1. Patch the LINE A terminals to the LINE B terminals.

2. Engage the MEASURE:METALLIC:TERM, SEND LEVEL -30, SEND IMPED:600, RECEIVE IMPED:600, WEIGHTING:50Hz - 20kHz, and REC A/SEND B pushbuttons.

3. Set the FREQUENCY HERTZ switch to 1004.

4. Set the RECEIVE LEVEL switch to -35 dBm (black scale).

5. Adjust the SEND VERNIER for -5 dBm on the TRANSMISSION LEVEL meter scale. A -40 dBm level (50 dBrn) is being "sent" to the RECEIVE section.

6. Set the RECEIVE LEVEL switch to 45 dBrn (red scale).

7. Engage the WEIGHTING:C-MSG pushbutton.

8. The NOISE METALLIC meter scale should read +5 dBrn.

9. Re-adjust the SEND LEVEL VERNIER, if necessary for a reading of +5 dBrn on the LEVEL meter NOISE METALLIC scale. Check the receive level at two or three frequencies chosen from the C-MSG response curve.

6.4.04 The Noise to Ground (N-G) input circuitry may be checked in the following manner:

1. Strap the T and R terminals of line A together.

2. Patch the T terminal of line B to the T and R of line A; and, the R terminal of line B to ground at the line A terminals.

3. Engage the CAL SEND, RECEIVE IMPED:600, SEND LEVEL 0, SEND IMPED/600, WEIGHTING:50Hz - 20kHz, and REC A/SEND B pushbuttons.

4. Set the FREQUENCY HERTZ switch to 1004.

5. Set the RECEIVE LEVEL switch to -5 dBm (black scale).

6. Adjust the SEND VERNIER for -1 dBm on the TRANSMISSION LEVEL meter scale. The Test Set is now calibrated to send .775 Vrms into a high impedance.

7. Set the RECEIVE LEVEL switch to 45 dBrn (red scale).

8. Engage the MEASURE:N-G, and the WEIGHTING:FLAT 3kHz pushbuttons.

9. The NOISE TO GROUND meter scale should read 45 dBrn (90 dBrn; meter scale plus LEVEL attenuator).

6.4.05 The rejection characteristics of the 1004 Hz NOTCH filter may be checked as follows: (T263B only)

1. Patch the LINE A terminals to the LINE B terminals.

2. Engage the MEASURE:METALLIC:TERM, SEND LEVEL -30, SEND IMPED:600, RECEIVE IMPED:600, WEIGHTING:50Hz-20kHz, and REC A/SEND B pushbuttons.

3. Set the FREQUENCY HERTZ switch to 1004.

4. Set the RECEIVE LEVEL switch to -35 dBm (black scale).

5. Adjust the SEND VERNIER for 0 dBm on the TRANSMISSION LEVEL meter scale. A -35 dBm level (55 dBrn) is being "sent" to the RECEIVE section.

6. Set the RECEIVE LEVEL switch to 0 dBrn (red scale). (Switch is not moved).

7. Engage the WEIGHTING:1010Hz NOTCH and WEIGHTING:3kHz pushbuttons.

8. The NOISE METALLIC meter scale should read less than 5 dBrn (This indicates the 55 dBrn signal level "sent" to the RECEIVE section is attenuated at least 50 dB.)

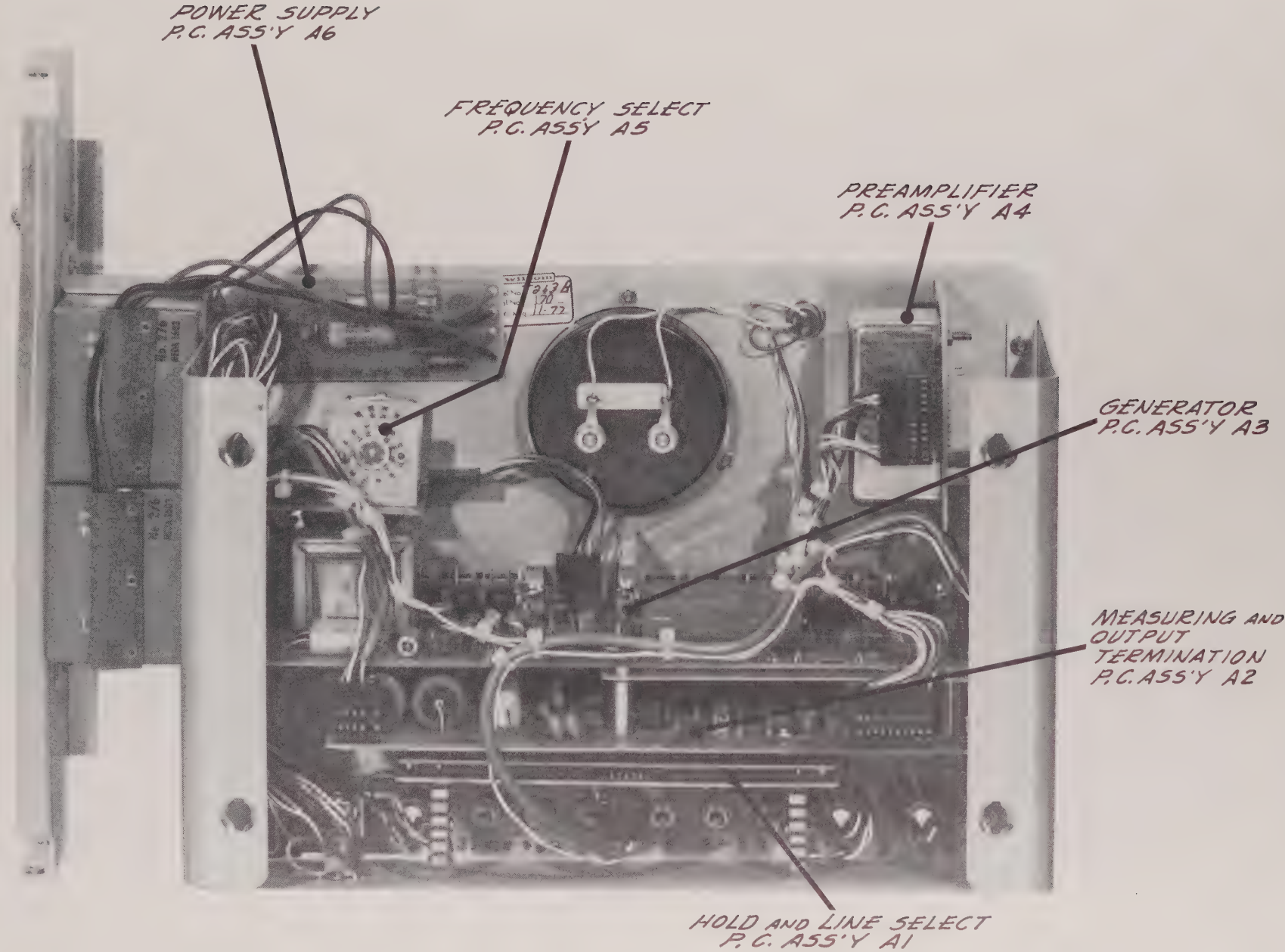
6.5 Repair Procedure

6.5.01 The Operational Checks of 6.2 through 6.4 should give a good indication of trouble location. The next step is to remove the set from its case.

CAUTION: DO NOT REMOVE ANY SCREWS FROM THE FRONT PANEL.

Unlock four DZUS fasteners from the back of the case. Grasp the set by the front panel handles and pull it from the case.

6.5.02 A good visual inspection may give a quick solution of the problem. Look for loose connectors, solder connections or component parts which have been jarred loose or broken, or any other visual clues. Pay particular attention to areas where the operational checks have indicated trouble. Reference to Figure 6-1 will help identify these areas.



T263B REAR VIEW-INTERNAL

Fig 6-1

6.5.03 The batteries may be replaced by loosening the two screws holding the battery bracket to the rear support bracket.

6.5.04 For better access to circuits, it may be desirable to remove the rear tray assembly. DISCONNECT THE BATTERIES. Remove the four screws which hold the tray to the two side mounting brackets. Slide the entire assembly up and out. The batteries may now be reconnected and the set operated for test puposes. If the fault is not apparent at this point, detailed trouble shooting may continue as outlined in 6.1.04.

6.5.05 Printed Circuit Assembly Removal —

1. A1 — Hold and Line Select

   a. Position Test Set upside down on bench.

   b. Remove P4 thru P8.

   c. Remove the two screws attaching the assembly to the front panel.

   d. Remove assembly A1.

2. A2 (T262B) — Measuring and Output Termination

   a. Position Test Set on its left side.

   b. Remove P8 from assembly A1 and P9, P10 from assembly A2.

   c. Locate the two standoffs connecting assembly A3. Remove two screws from the non-component side of A2 attaching standoffs.

   d. Remove four screws attaching assembly A2 to the front panel.

   e. Remove assembly A2.

3. A2 (T263B) — Measuring and Output Termination

   a. Remove two screws attaching assembly A1 to the front panel — do not disconnect plugs.

   b. Position Test Set on its left side.

   c. Remove P8 from assembly A1 and P9, 10 from assembly A2.

   d. Locate the two standoffs connecting assembly A2 to the shield on assembly A3. Remove two screws from the non-component side of A2 attaching standoffs.

e. Remove four screws attaching assembly A2 to the front panel.

f. Remove assembly A2.

4. A3 — Generator

a. Position Test Set on its left side.

b. Locate the two standoffs connecting assembly A2 to the shield on assembly A3. Remove two screws from the non-component side of A2 attaching standoffs.

c. Position Test Set upright and disconnect battery connectors.

d. Remove four screws hold rear support bracket and remove bracket with batteries.

e. Remove P16 from assembly A5 and P8 from assembly A1.

f. Remove P9, P10 from assembly A2 and P11, P13 from assembly A3.

g. Remove four screws attaching assembly A3 to the front panel.

h. Remove P14 from assembly A3 as the assembly is being removed from the set.

7.0 ALIGNMENT AND CALIBRATION

7.1 General

7.1.01 This section provides information needed to align the Models T262B/T263B Transmission and Noise Test Sets and verifies the proper operation of the Sets. Alignment information covers adjustments which can be made by field personnel, using standard test equipment.

7.1.02 The Operational Checks in Section 6 should be performed BEFORE any attempt is made to calibrate the Test Set. Malfunctions uncovered should be repaired prior to completion of this procedure.

7.1.03 Applying Power — To eliminate repetitive instructions, it is assumed that power will be removed from the Test Set during all disassembly or assembly operations and reapplied prior to testing. Allow 5 minutes for circuit to stabilize each time power is applied.

7.1.04 The Test Set should be removed from its case before starting the Alignment and Calibration procedure. See Section 6.5.

7.1.05 Sections 7.3 through 7.9 are the detailed performance checks. The related calibration section is indicated where applicable. An alignment check sheet should be completed during this procedure.

7.2 Equipment Required

1. Electronic ac voltmeter or Level Meter accurate to within ±.1 dB from 50 Hz to 20 kHz. Fluke 8520A
2. Digital Multimeter — VOM Tek DM502 Fluke 8921A
3. General purpose oscillator — 50 Hz to 20 kHz; +10 dBm to -40 dBm; low output impedance. HP3[illegible]
4. Variable dual dc power supply
5. Frequency Counter HP5345A
6. General Purpose Oscilloscope

7.3 Line Circuit Check

1. Short the DIAL terminal posts together and engage the LINE A:DIAL pushbutton.
2. Using a VOM check for approximately 50 ohms of resistance between the T & R terminals of LINE A.

3. Engage the LINE B:DIAL pushbutton and release the LINE A:DIAL pushbutton.

4. Using a VOM check for approximately 50 ohms of resistance between the T and R terminals of LINE B.

5. Remove the short from the DIAL posts.

6. Insert in the DIAL 310 jack, a 310 type plug with the T and R shorted.

7. Insert a 310 type plug in the LINE B jack.

8. Measure approximately 50 ohms between the T and R of the LINE B 310 plug.

9. Remove both 310 plugs.

10. Measure greater than 10 megohms between each LINE terminal (T & R) and GND.

7.4 Hold Circuit

7.4.01 The hold circuit is given a detailed test in a special Wilcom Test Fixture following a separate procedure. Hold circuit criteria are the following:

1. Must draw sufficient current to hold the line with dc applied in either polarity. The T262B/T263B hold circuit will draw at least 25 mA when 48 volt battery is applied through 1200 ohms resistance or 24 volt battery is applied through 400 ohms.

2. Must have insertion loss limits compatable with test set accuracy over the specified frequency range.

3. Must cause no distortion or signal clipping at the maximum signal voltage level to which it will be subjected. In the T262B/T263B a maximum signal voltage of 3 volts rms or 4.24 volts peak occures at +10 dBm in 900 ohm bridging.

7.4.02 An electronic hold circuit is used because an inductive hold coil designed to meet criteria 1 and 2 would be excessively large and heavy.

7.5 LOOP mA Check

7.5.01 The following steps check the LOOP mA function and verify that the hold circuit is not drawing current during the LOOP mA measurement.

1. Apply 46 volts dc through 1700 ohms and a low impedance current meter to the T and R of LINE A. The T terminal should be positive relative to the R terminal.

2. Engage the LOOP mA and the REC A/SEND B pushbuttons. The current meter and the T262B/T263B meter (LOOP mA scale) should read 24 mA ±2.2 mA.

3. Engage the LINE A:HOLD pushbutton. The current meter and the T262B/T263B readings are unchanged.

4. Reverse the polarity of the T and R connection. The readings remain unchanged.

5. Apply 53 volts dc in either polarity through 400 ohms and the current meter to the T and R of LINE A.

6. The current meter and the T262B/T263B meter (LOOP mA scale) should read 88 mA ±5.5 mA.

7. Apply 46 volts dc through 1700 ohms and a low impedance current meter to the T and R of LINE B. The T terminal should be positive relative to the R terminal.

8. Engage the LOOP mA and the REC B/SEND A pushbuttons. The current meter and the T262B/T263B meter (LOOP mA scale) should read 24 mA ±2.2 mA.

9. Engage the LINE B:HOLD pushbutton. The current meter and the T262B/T263B readings are unchanged.

10. Reverse the polarity of the T and R connection. The readings remain unchanged.

11. Apply 53 volts dc in either polarity through 400 ohms and the current meter to the T and R of LINE B.

12. The current meter and the T262B/T263B meter (LOOP mA scale) should read 88 mA ±5.5 mA.

7.6 BATT TEST Check

7.6.01 The battery test circuit is given a detailed test using a special Wilcom Test Fixture to replace the batteries. Battery test circuit criteria are the following:

1. Provides a voltage corresponding to the capacity of the lower battery.

2. Provides the voltage required for a GOOD BATT meter indication when the lower battery voltage is above 6.45V ±0.15V.

7.7 METALLIC IMPEDANCE Check

1. Connect the signal generator, high impedance ac voltmeter and 600 ohm precision resistors as shown in FIG. 7-1.

2. Set the signal generator for an output frequency of 1000 Hz.

3. Adjust the generator for .775 Vrms (e_1) as indicated on the voltmeter.

4. Engage the following pushbuttons:

   a) REC A/SEND B

   b) MEASURE:METALLIC:BRDG

   c) IMPED:600

   d) WEIGHTING:50Hz-20kHz

9db-R245
-9db-R233

5. Connect the LINE A T and R terminals of the T262B/T263B to the points marked 1 and 2 in FIG 7-1. The ac voltmeter reading should not drop below .757 Vrms.

NOTE: The signal generator output level must not change when the T262B/T263B is connected across R2.

NOTE: To avoid errors due to hook-up lead resistance, the precision resistor should be located at the T & R terminals, and the ac voltmeter should be connected as close to the resistor as possible.

6. Remove R2 from the test set-up of step 5 and engage the MEASURE:METALLIC:TERM.

7. Adjust the generator for a 1.549 Vrms output level (e_o) and measure .775 Vrms ±.008 at the T and R of the T262B/T263B (e_1).

7.8 SIGNAL MEASUREMENT Checks

NOTE: The signal measurement checks should be performed in the following sequence to insure proper positioning of all controls.

7.8.01 To avoid errors due to hook-up lead resistance, the precision resistor should be located at the T & R terminals, and the ac voltmeter should be connected as close to the resistor as possible.

7.8.02 For a balanced input signal, the precision resistor would be split, 450 ohms in each side of the line. However, most ac voltmeters used in calibration are single ended. Therefore, calibration is normally performed with the precision resistor in series with one side of the line and the other side grounded.

7.8.03 Calibration accuracy in all cases (except N-G) is specified in terms of input power, not voltage. (For bridging measure-

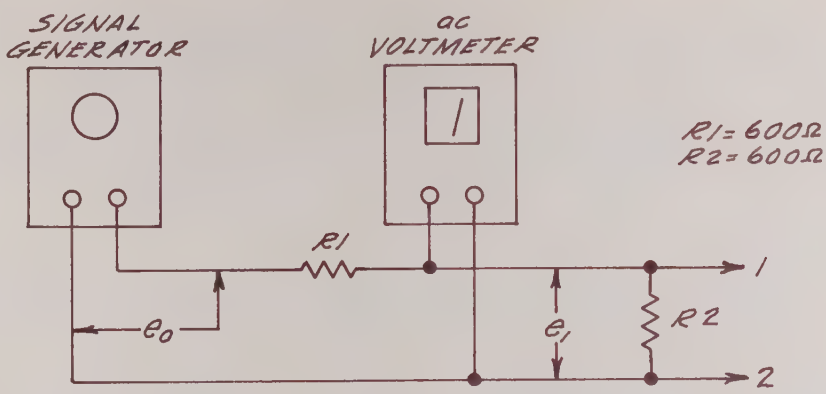


Fig. 7-1

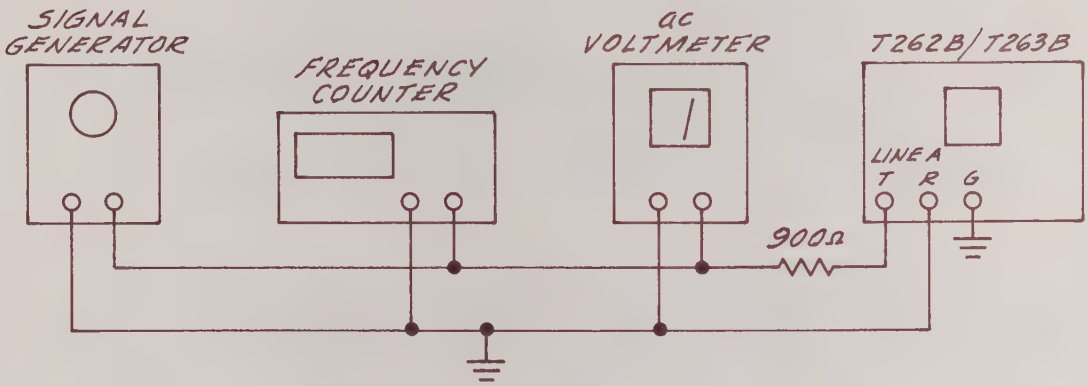


Fig. 7-2

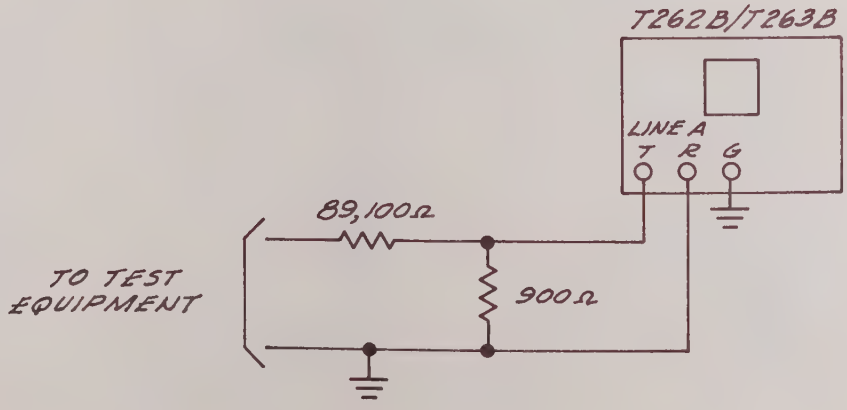


Fig. 7-3

ments, this is power into an external termination.) This is the reason for monitoring input voltage ahead of a precision series resistor. The measured voltage should be precisely twice the calculated voltage for a specified level. Thus 0 dBm, 900 ohms is .9487 volts, and the ac voltmeter reading ahead of the series resistance for this level is 1.8974 volts.

7.8.04 Initial Conditions

1. Establish the test set-up of Figure 7-2 and set the T262B/T263B controls as follows:

RECEIVE LEVEL	0 dBm (black scale)
MEASURE:METALLIC:TERM	Engaged
IMPED:900	Engaged
WEIGHTING:50Hz-20kHz	Engaged
LINE A:DIAL	Released
LINE A:HOLD	Released
REC A/SEND B	Engaged
LINE B:DIAL	Released
LINE B:HOLD	Released

1st

7.8.05 LEVEL Attenuator Check 2nd Send output check

HP 3336B

NOTE: Calibration Sections 7.10.05 and 7.10.06 may be performed to eliminate errors in the 0 dBm reference level.

1. Adjust the signal generator for 1 kHz at 3.374 Vrms. Set the T262B/T263B RECEIVE LEVEL switch to the ±10 dBm position. The T262B/T263B meter reads -5 dBm ±.2 dB.

2. Set the RECEIVE LEVEL switch to the +5 dBm position. The T262B/T263B meter reads 0 dBm ±.1 dB.

3. Check the remaining LEVEL switch positions at the ac voltmeter levels indicated. The T262B/T263B meter reading should deviate no more than 0.1 dB between adjacent steps and the maximum deviation over the entire range shall be no more than 0.25 dB.

LEVEL SWITCH	ac VOLTMETER	T262B/T263B
+5 dBm	3.374	0 dBm
0 dBm	1.8974	0 dBm
-5 dBm	1.067	0 dBm
-10 dBm	.6000	0 dBm
-15 dBm	.3374	0 dBm
-20 dBm	.1897	0 dBm
-25 dBm	.1067	0 dBm
-30 dBm	.0600	0 dBm
-35 dBm	.0337	0 dBm

7.8.06 Transmission Response Checks

NOTE: Calibration — Section 7.10.06

1. Adjust the signal generator for 1 kHz at 1.897 Vrms. Set the RECEIVE LEVEL switch to 0 dBm. The T262B/T263B meter reads 0 dBm ±.1 dB.

2. If necessary, adjust the signal generator output level for a 0 dBm TRANSMISSION LEVEL meter indication. Note the signal generator level on the ac meter.

3. Maintaining the level noted in step 2, adjust the signal generator to the frequencies indicated in the WEIGHTING: 50Hz-20kHz table of the alignment check sheet and verify T262B/T263B meter readings within the required tolerances by adjusting the RECEIVE LEVEL switch for on-scale meter readings.

4. Adjust the signal generator for 1 kHz at 1.897 Vrms. Set the RECEIVE LEVEL switch to 0 dBm and engage the WEIGHTING:200Hz-20kHz pushbutton. The T262B/T263B meter reads 0 dBm ±.1 dB.

5. If necessary, adjust the signal generator output level for a 0 dBm reading. Note the signal generator level on the ac meter.

6. Maintaining the level noted in step 5, adjust the signal generator to the frequencies indicated in the WEIGHTING: 200Hz-20kHz table of the alignment check sheet and verify T262B/T263B meter readings within the required tolerances.

7.8.07 Noise Response Checks

NOTE: Calibration — Section 7.10.08

1. Replace the 900 ohm series precision resistor in the test set-up of Figure 7-2 with a 40 dB pad as shown in Figure 7-3.

2. Set the RECEIVE LEVEL switch to 35 dBrn (red scale) and engage the following pushbuttons:

   MEASURE:METALLIC:TERM

   IMPED:900

   WEIGHTING:FLAT 3kHz

   REC A/SEND B

3. Adjust the signal generator for 1 kHz at .9487 Vrms. The T262B/T263B meter reads 9 dBrn ±.2 dB on the NOISE METALLIC scale (44 dBrn).

4. If necessary, adjust the signal generator output level for a 44 dBrn reading on the NOISE METALLIC scale. Note the signal generator level on the ac meter.

5. Maintaining the level noted in step 4, adjust the signal generator to the frequencies indicated in the FLAT 3kHz table of the alignment check sheet and verify T262B/ T263B meter readings within the required tolerances by adjusting the RECEIVE LEVEL switch for on-scale meter readings.

6. Adjust the signal generator for 1 kHz at 3.007 Vrms and engage the WEIGHTING:C-MSG pushbutton.

7. Set the RECEIVE LEVEL switch to 45 dBrn. The T262B/ T263B meter reads 9 dBrn ±.2 dB on the NOISE METALLIC scale (54 dBrnc).

8. Maintain the level noted in step 7, adjust the signal generator to the frequencies indicated in the C-Message table of the alignment check sheet and verify T262B/ T263B meter readings within the required tolerances.

7.8.08 1010 Hz NOTCH Check

NOTE: Section 7.8.07 steps 1 thru 3 must have been completed prior to proceeding. Calibration — Section 7.10.10.

1. Adjust the signal generator for 3.374 Vrms at 1 kHz. Engage the 1010Hz NOTCH pushbutton.

2. Maintaining a 3.374 Vrms signal generator level, adjust the signal generator to the frequencies indicated in the NOTCH portion of the alignment check sheet and verify meter readings within the required tolerances.

7.8.09 Range Extender Check

1. Engage the MEASURE:METALLIC:TERM, IMPED:900 and FLAT 3kHz pushbuttons. Release the 1010Hz NOTCH pushbutton.

2. Adjust the signal generator for 3.00 Vrms at 1 kHz and set the RECEIVE LEVEL switch to 45 dBrn. The T262B/T263B indicates 54 dBrn ±.2 dB. Readjust signal generator if necessary to eliminate error before proceeding to next step.

3. Set the RECEIVE LEVEL switch to 15 dBrn. Press the PUSH TO ADD 30 dB button and observe the T262B/T263B reads 24 dBrn.

7.8.10 N-G Accuracy Check

1. Engage the MEASURE:N-G pushbutton. Remove the 40 dB pad. Connect a short between the T and R terminals of LINE A.

2. Connect the signal generator between the T or R terminals of LINE A and GND and adjust for a .388 Vrms level at 1 kHz.

3. Set the RECEIVE LEVEL switch to 35 dBrn. The T262B/T263B meter should read 49 dBrn N-G ±.5 dB.

7.8.11 Common Mode Rejection Check

1. Engage the MEASURE:N-M pushbutton

2. Adjust the signal generator for 1 Vrms and the frequencies indicated in the Common Mode Rejection section of the alignment and check sheet.

3. Record the readings and verify they are within the required tolerances.

7.8.12 Monitor Outputs

1. Remove the short between the T and R terminals of LINE A.

2. Set the RECEIVE LEVEL switch to 0 dBm and engage the WEIGHTING:50Hz-20kHz pushbutton.

3. Connect the signal generator between the T and R terminals of LINE A and adjust the generator for a 1 kHz signal at +1 dBm as observed on the T262B/T263B meter.

4. Insert a 310 plug in the DIAL and MONITOR jack. With a dc voltmeter, measure the voltage on the T and R of the 310 plug (T is positive relative to R). The voltage should be approximately 81 mV.

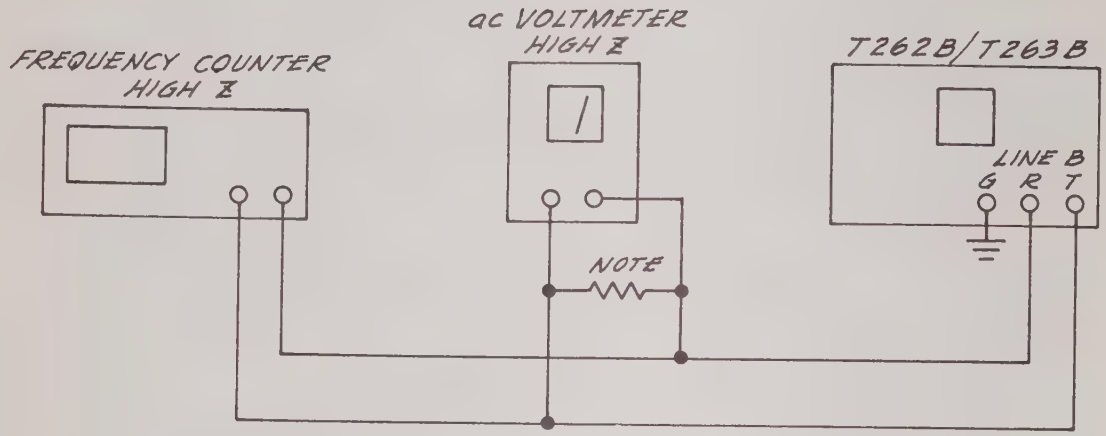
7.9 SEND Generator Checks

NOTE: Calibration — Section 7.11.

7.9.01 Send Impedance Check —

1. Establish the test set-up of Figure 7-4, without the external termination resistor, and set the T262B/T263B controls as follows:

FREQUENCY HERTZ	1004
SEND LEVEL 0 dBm	Engaged
IMPED:900	Engaged
TEST TERM/SEND	Released
REC A/SEND B	Engaged



NOTE
EXTERNAL TERMINATION: 600 OR 900 OHMS

Fig. 7-4

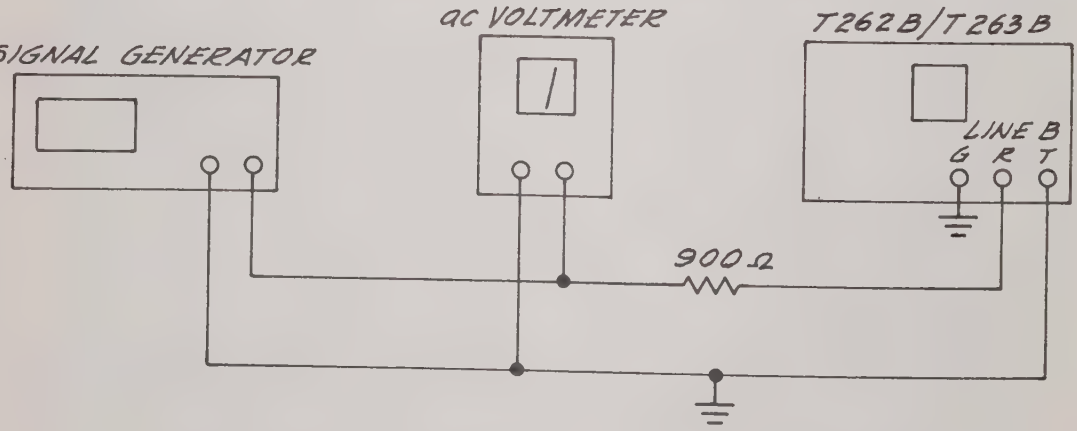


Fig. 7-5

LINE B:DIAL	Released
LINE B:HOLD	Released

2. Adjust the SEND LEVEL VERNIER control for a 1.897 Vrms reading on the ac voltmeter.

3. Connect the 900 ohm terminating resistor as shown in Figure 7-4. The ac voltmeter reads 0.949 Vrms ±0.01 Vrms.

4. Remove the 900 ohm terminating resistor, engage the IMPED: 600 pushbutton, and adjust the SEND LEVEL VERNIER control for a 1.549 Vrms reading on the ac voltmeter.

5. Connect the 600 ohm terminating resistor as shown in Figure 7-4. The ac voltmeter reads 0.775 Vrms ±0.008 Vrms.

7.9.02 SEND FREQUENCY and LEVEL Check — This check verifys proper operation of the FREQUENCY HERTZ switch and SEND LEVEL attenuator. 7.8.05

1. The Send Impedance Check must be complete prior to performing this check.

2. Adjust the SEND LEVEL VERNIER control for a 0.775 Vrms (0 dBm, 600 ohms) reading on the ac voltmeter.

3. The frequency counter should read 1004 Hz ±2.5 Hz.

4. Set the FREQUENCY HERTZ switch to each of the ten fixed frequencies and verify a frequency counter reading within the tolerances given in the alignment check sheet.

5. Return the FREQUENCY HERTZ switch to 1004.

6. Adjust the SEND LEVEL VERNIER control fully clockwise. The ac voltmeter should read greater than 0.869 Vrms.

7. Adjust the SEND LEVEL VERNIER control fully counterclockwise. The ac voltmeter should read less than 0.218 Vrms.

8. Adjust the SEND LEVEL VERNIER control for a 0.775 Vrms. reading on the ac voltmeter.

7.9.03 Harmonic Distortion Check —

NOTE: Calibration — Section 7.11.

1. Replace the ac voltmeter in Figure 7-4 with a distortion analyzer.

2. Set the T262B/T263B controls to send a 0 dBm, 600 ohm, level at 1004 Hz on LINE B.

3. Check each position of the FREQUENCY HERTZ switch and verify total harmonic distortion greater than 50 dB below the fundamental.

7.9.04 Test Termination Check — Verify change with Fluke 8921A

1. Establish the test set-up of Figure 7-5 and set the T262B/T263B controls as follows:

REC A/SEND B	Engaged
TEST TERM/SEND	Engaged
LINE B:DIAL	Released
LINE B:HOLD	Released
MEASURE:METALLIC:BRDG	Engaged
WEIGHTING:50Hz-20kHz	Engaged
RECEIVE LEVEL	+5 dBm
RECEIVE IMPED:900	Engaged
SEND IMPED:900	Engaged

2. Patch the T and R terminals of LINE A to the T and R terminals of LINE B.

3. Adjust the signal generator for 500 Hz at a 1 Vrms level as observed on the ac voltmeter. The T262B/T263B meter reads approximately -3.1 dBm on the TRANSMISSION LEVEL scale (+2 dBm).

4. Engage the RECEIVE IMPED:600 pushbutton. The T262B/T263B meter reads approximately -3.5 dBm.

7.10 Signal Measurement Calibration

7.10.01 To avoid errors due to hook-up lead resistance, the precision resistor should be located at the T & R terminals, and the ac voltmeter should be connected as close to the resistor as possible.

7.10.02 For a balanced input signal, the precision resistor would be split, 450 ohms in each side of the line. However, most ac voltmeters used in calibration are single ended. Therefore, calibration is normally performed with the precision resistor in series with one side of the line and the other side grounded.

7.10.03 Calibration accuracy in all cases (except N-G) is specified in terms of input power, not voltage. (For bridging measurements, this is power into an external termination.) This is the reason for monitoring input voltage ahead of a precision series resistor. The measured voltage should be precisely twice the calculated voltage for a specified level. Thus 0 dBm, 900 ohms is .9487 volts, and the ac voltmeter reading ahead of the series resistance for this level is 1.8974 volts.

7.10.04 Initial Conditions

1. Establish the test set-up of Figure 7-2 and set the T262B/T263B controls as follows:

Control Designation	Position
RECEIVE LEVEL	0 dBm (black scale)
MEASURE:METALLIC:TERM	Engaged
IMPED:900	Engaged
WEIGHTING:50Hz-20kHz	Engaged
LINE A:DIAL	Released
LINE A:HOLD	Released
REC A/SEND B	Engaged

7.10.05 Reference Voltage Adjust

1. Using a dc voltmeter, with negative lead on common and positive lead on E202 of the A2 assembly, check for -4V dc. If necessary select R249 (nominal 250k) to achieve the desired reference voltage.

7.10.06 Meter Scale and Transmission Level Calibration

NOTE: Sections 7.10.04 and 7.10.05 must have been completed before proceeding.

1. Adjust the signal generator for 1 kHz at a level of .673 Vrms.

2. Adjust R233 (O/A LEVEL ADJ) on assembly A2 for a -9 dBm indication on the T262B/T263B meter.

3. Adjust the signal generator for 1 kHz at a level of 1.897 Vrms.

4. Adjust R245 (SCALE ADJ) on assembly A2 for a 0 dBm indication on the T262B/T263B meter.

5. Repeat steps 1 through 4 until adjustment of R233 or R245 is not required to achieve the desired accuracy.

7.10.07 Frequency Response — Capacitor C227 is factory selected to compensate for production variations in transformer T1 and amplifier bandwidths. A change in capacitor value should not be required unless there has been a component change.

NOTE: Sections 7.10.04 thru 7.10.06 must have been completed before proceeding.

1. Adjust the signal generator for a 0 dBm T262B/T263B meter indication at 1 kHz. Note the ac voltmeter reading (approx. 1.897 Vrms).

2. Maintaining the signal generator output level of step 1, verify a T262B/T263B meter reading within tolerance for the frequencies indicated in the Check Sheet.

3. If the frequency response is not within tolerance above 4000 Hz, a capacitance value for C227 on assembly A2 should be selected to correct the error. Reference to the nominal signal levels of Figure 5-2 may help to isolate the source of any major level variation.

7.10.08 Noise Level Calibration

NOTE: Sections 7.10.04 thru 7.10.06 must have been completed before proceeding.

1. Replace the 900 ohm series precision resistor with a 40 dB pad as shown in Figure 7-3.

2. Engage the WEIGHTING:FLAT 3kHz pushbutton. Adjust the signal generator for 1 kHz at a level of .9487 Vrms.

3. Adjust R223 (NOISE LEVEL ADJ) on assembly A2 for a 9 dBrn indication on the T262B/T263B NOISE METALLIC meter scale. (44 dBrn)

4. Engage the WEIGHTING:C-MSG pushbutton. Adjust R215 (C-MSG LEVEL ADJ) on assembly A2 for a 9 dBrn indication on the T262B/T263B NOISE METALLIC meter scale.

7.10.09 C-Message Response – Capacitor C226 is factory selected to compensate for production variations in amplifier bandwidths. A change in capacitor value should not be required unless an active component in the C-Msg filter has been changed.

NOTE: Sections 7.10.04 thru 7.10.08 must have been completed before proceeding.

1. Adjust the signal generator for a 9 dBrn indication on the T262B/T263B NOISE METALLIC meter scale (44 dBrn) at 1 kHz. Note the ac voltmeter reading.

2. Maintaining the ac voltmeter reading, tune the signal generator to 4 kHz.

3. Adjust the RECEIVE LEVEL attenuator for an on-scale meter reading. The T262B/T263B meter should indicate 29.5 dBrn ±3 dBrn.

4. If the reading is below 26.5 dBrn, select a capacitance value for C226 to bring the reading to nominal.

5. Do not overdo the capacitance. To check whether the pad capacitance is too large a value, tune the signal generator to 2500 Hz. If the response is out of tolerance, reduce the capacitance value.

7.10.10 Notch Filter Calibration

NOTE: Sections 7.10.04 thru 7.10.07 steps 3 must have been completed before proceeding.

1. Engage the WEIGHTING:3kHz pushbutton. Adjust the signal generator for 1 kHz at a level of 3.374 Vrms.

2. Set the RECEIVE LEVEL switch to 45 dBrn. The meter indicates 10 dBrn.

3. Engage the WEIGHTING:1010Hz NOTCH pushbutton. Adjust the signal generator for 1025 Hz at 3.374 Vrms.

4. Adjust R604 (UPPER FREQ ADJ) on assembly A2 for the lowest level (dBrn) as observed on the T262B/T263B meter. Maintain an on-scale meter indication by adjusting the RECEIVE LEVEL switch. If less than 15 dBrn cannot be achieved, a capacitor – 33pF or less – may be used to pad across R607 to minimize the level.

NOTE: If capacitive padding is required, assembly A3 must be removed from the front panel. Refer to Section 6.5.04.

5. Adjust the signal generator for 995 Hz at 3.374 Vrms.

6. Adjust R617 (LOWER FREQ ADJ) and pad across R620 with a capacitor, if required, to obtain less than 5 dBrn on the T262B/T263B meter.

7. Adjust the signal generator for 1010Hz at 3.374 Vrms.

8. Adjust R630 (MIDDLE FREQ ADJ) and pad across R633 with a capacitor, if required, to obtain less than 5 dBrn on the T262B/T263B meter.

9. Adjust the signal generator through the frequency range of 850 Hz to 1200 Hz and verify the requirements of the alignment check sheet are met. Repeat the adjustments of this section if required.

7.11 Send Generator Calibration

7.11.01 To avoid errors due to hook-up lead resistance, the precision resistor should be located at the T and R terminals, and the ac voltmeter should be connected as close to the resistor as possible.

7.11.02 For a balanced output signal, the precision resistor would be split, 450 ohms in each side of the line. However, most ac voltmeters used in calibration are single ended. Therefore, calibration is normally performed with the precision resistor in series with one side of the line and the other side grounded.

7.11.03 Initial Conditions

1. Establish the test set-up of Figure 7-4 using a 900 ohm terminating resistor and set the T262B/T263B controls as follows:

RECEIVE LEVEL	0 dBm
CAL SEND	Engaged
IMPED:900	Engaged
WEIGHTING:50Hz-20kHz	Engaged
REC A/SEND B	Engaged
FREQUENCY HERTZ	304
SEND LEVEL 0 dBm	Engaged
IMP:900	Engaged
TEST TERM/SEND	Released
LINE A and B:DIAL	Released
LINE A and B:HOLD	Released

7.11.04 Oscillator Stability Adjust

NOTE: The T262B/T263B should be powered by the internal batteries to prevent dc grounding conflicts. The circuit common is not chasis or earth ground for dc voltages.

1. Connect the input of a dc coupled oscilloscope to E6 on assembly A3.

2. Connect the oscilloscope ground to E2 on assembly A6 (power supply circuit common).

3. Note the dc level of the negative full wave rectified signal at E6.

4. The value of C304 is selected to maintain the approximate dc level noted in step 3 for all ten positions of the FREQUENCY HERTZ switch. Do not use greater than 100 pF.

7.11.05 CAL SEND Calibration

NOTE: Sections 7.10.04 thru 7.10.06 must have been completed before proceeding.

1. Set the FREQUENCY HERTZ switch to the 1004 position.

2. Adjust the SEND LEVEL VERNIER control for a 0.9487 Vrms voltmeter reading.

3. Adjust R362 (CAL SEND TRIM ADJ) on assembly A3 for a 0 dBm reading on the T262B/T263B TRANSMISSION LEVEL meter scale.

7.11.06 FREQUENCY HERTZ Calibration

1. Adjust R316 (FREQ TRIM ADJ) on assembly A3 for a 1004 Hz reading on the frequency counter.

2. Set the FREQUENCY HERTZ switch to each of the ten fixed frequencies and verify a frequency counter reading within the tolerances given in the alignment check sheet.

7.11.07 Harmonic Distortion Adjust

1. Replace the ac voltmeter in Figure 7-4 with a distortion analyzer.

2. Set the FREQUENCY HERTZ switch to the 1004 position. The T262B/T263B should be sending a 0 dBm, 900 ohm, level on LINE B.

NOTE: The battery support bracket may be removed to provide more direct access to R370 and R371. Refer to Section 6.5.04.

3. Unsolder select resistor R370 or R371 and connect a switchable resistor (decade or substitution box) in its place.

4. Select resistor value for minimum distortion with the substituted resistance at either the R370 or R371 location.

5. Check each position of the FREQUENCY HERTZ switch and verify total harmonic distortion greater than 50 dB below the fundamental.

6. Solder the selected resistance in the correct location and recheck the distortion level.

T262B/T263B CHECK SHEET

PRELIMINARY CHECK:

Battery Test_____

Reference Voltage Check_____Vdc 4 Vdc ±.05 Vdc

LINE CIRCUIT CHECK:

1. T & R DIAL_____ohms
2. 310 Jacks_____
3. >10 M ohms_____

HOLD CIRCUIT CHECK:

Good_____

LOOP mA CHECK:

46V/1700Ω_____mA 24 mA ± (5% +1 mA)

53V/400Ω_____mA 82.7 mA ± (5% +1 mA)

BATT TEST CHECK:

Positive voltage low limit_____+6.45V ±0.15V

Negative voltage low limit_____-6.45V ±0.15V

METALLIC IMPEDANCE CHECK:

Bridge 600Ω_____Vrms .757 Vrms min.

Term 600Ω_____Vrms ± .008 Vrms

Term 900Ω_____Vrms ±.01 Vrms

SIGNAL MEASUREMENT CHECK:

Level Attenuator Check

0.1 dB_____ 0.25 dB_____

Transmission Response Check

FLAT 50Hz - 20kHz

50Hz	-.3dBm_____	+.3dBm
100Hz	-.3dBm_____	+.3dBm
200Hz	-.1dBm_____	+.1dBm
1000Hz	-.1dBm_____	+.1dBm
4,500Hz	-.3dBm_____	+.3dBm
10,000Hz	-.3dBm_____	+.3dBm
20,000Hz	-.3dBm_____	+.3dBm

200Hz - 20kHz

60Hz		-30dBm
200Hz	-4.0dBm	-3.0dBm
300Hz	-.3dBm	+.3dBm
500Hz	-.1dBm	+.1dBm
1,000Hz	-.1dBm	+.1dBm
4,000Hz	-.1dBm	+.1dBm
4,500Hz	-.3dBm	+.3dBm
10,000Hz	-.3dBm	+.3dBm
20,000Hz	-.3dBm	+.3dBm

Noise Response Check

FLAT 3k

60Hz	42.3dBrn	45.7dBrn
400Hz	42.3dBrn	45.7dBrn
1,000Hz	43.8dBrn	44.2dBrn
2,000Hz	42.2dBrn	44.2dBrn
3,000Hz	39.2dBrn	42.8dBrn
6,000Hz	28.7dBrn	34.7dBrn
12,000Hz	16.7dBrn	22.7dBrn
20,000Hz	8.0dBrn	14.0dBrn

C-MESSAGE

70Hz		.2dBrn	4.2dBrn
300Hz		36.5dBrn	38.5dBrn
500Hz		45.5dBrn	47.5dBrn
700Hz		50.3dBrn	52.3dBrn
1,000Hz	REF	53.8dBrn	54.2dBrn
1,500Hz		52.0dBrn	54.0dBrn
2,500Hz		51.6dBrn	53.6dBrn
3,500Hz		44.4dBrn	48.4dBrn
5,000Hz		22.5dBrn	28.5dBrn
10,000Hz			< 16.5dBrn
20,000Hz			< 4.5dBrn

1010 Hz NOTCH

400Hz	54.5dBrn	55.5dBrn
862Hz	52.0dBrn	55.5dBrn
995Hz - 1025Hz		5.0dBrn
1182Hz	52.0dBrn	55.5dBrn
1700Hz	54.5dBrn	55.5dBrn

Range Extender Check:

30dB_____

Noise to Ground Check:

N-G_____

Common Mode Rejection Check:

1kHz_____dBrn (< 12dBrn)

10kHz_____dBrn (< 32dBrn)

Monitor Output Check:

MONITOR_____(.080Vrms ±.010Vrms)

8.0 SCHEMATIC AND LAYOUT DRAWINGS

8.1 General

8.1.01 The following pages provide the illustrations useful in locating and identifying the various assemblies that make up the Model T262B/T263B TRANSMISSION AND NOISE TEST SET.

8.1.02 The necessary schematic diagrams and layout drawings of each sub-assembly are given to allow identification of various components, controls and terminals on the circuit boards. This information will be useful to those with the facilities to provide maintenance and calibration of this test equipment.

8.1.03 This section contains figures 8-1 through 8-21. The titles of these figures are given in the Table of Contents.

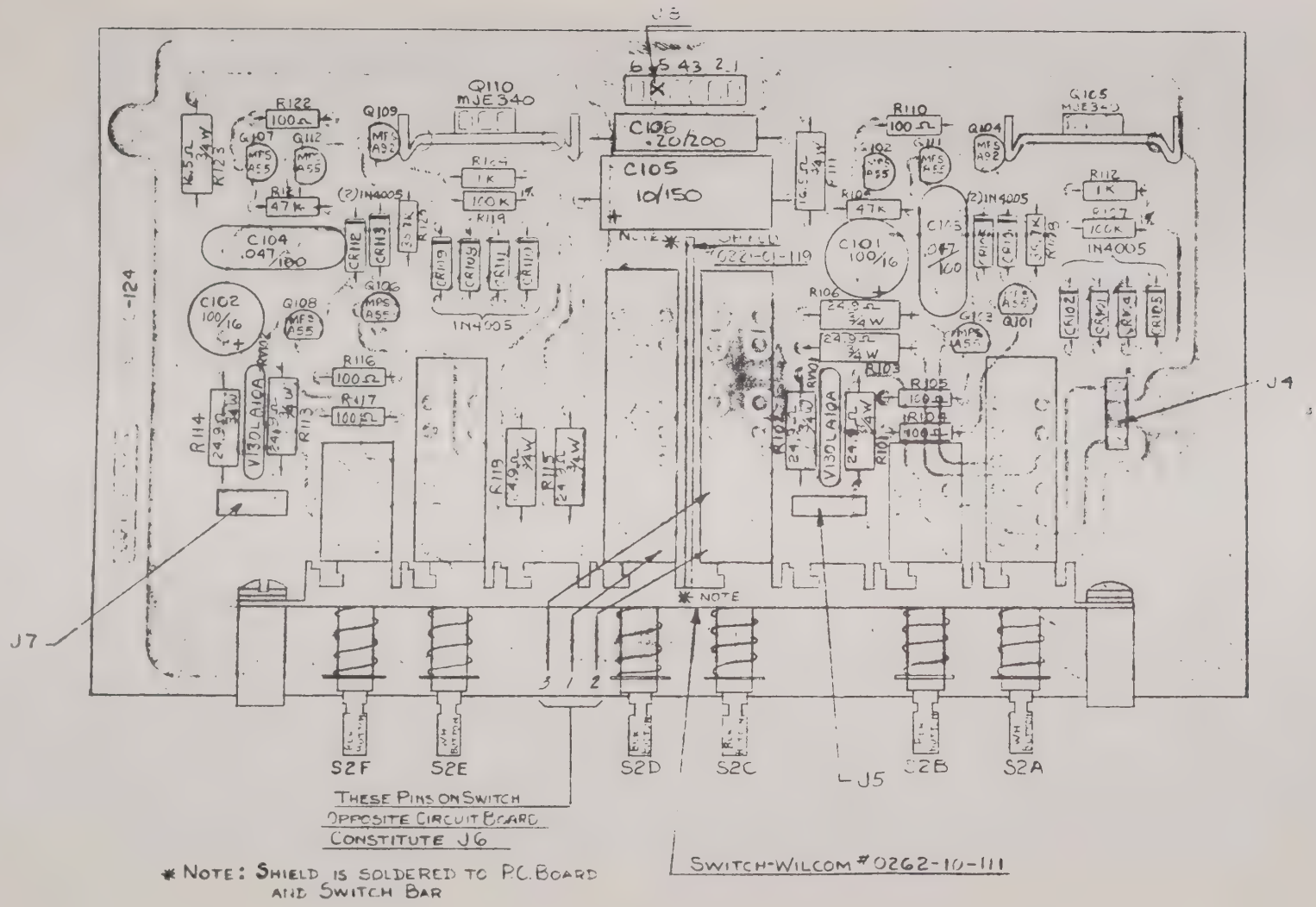


FIGURE 8-1

HOLD AND LINE SELECT P.C. ASSEMBLY

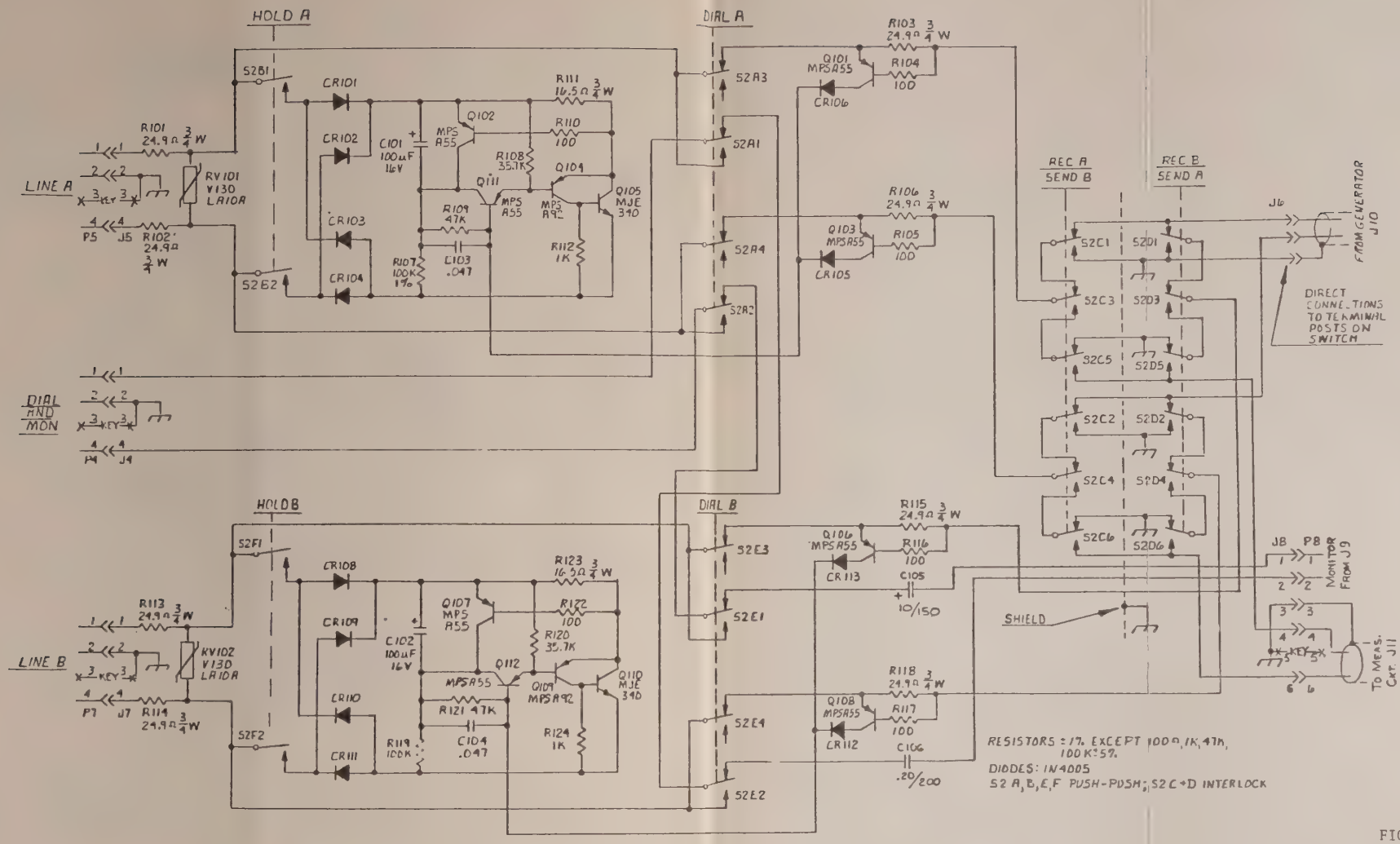
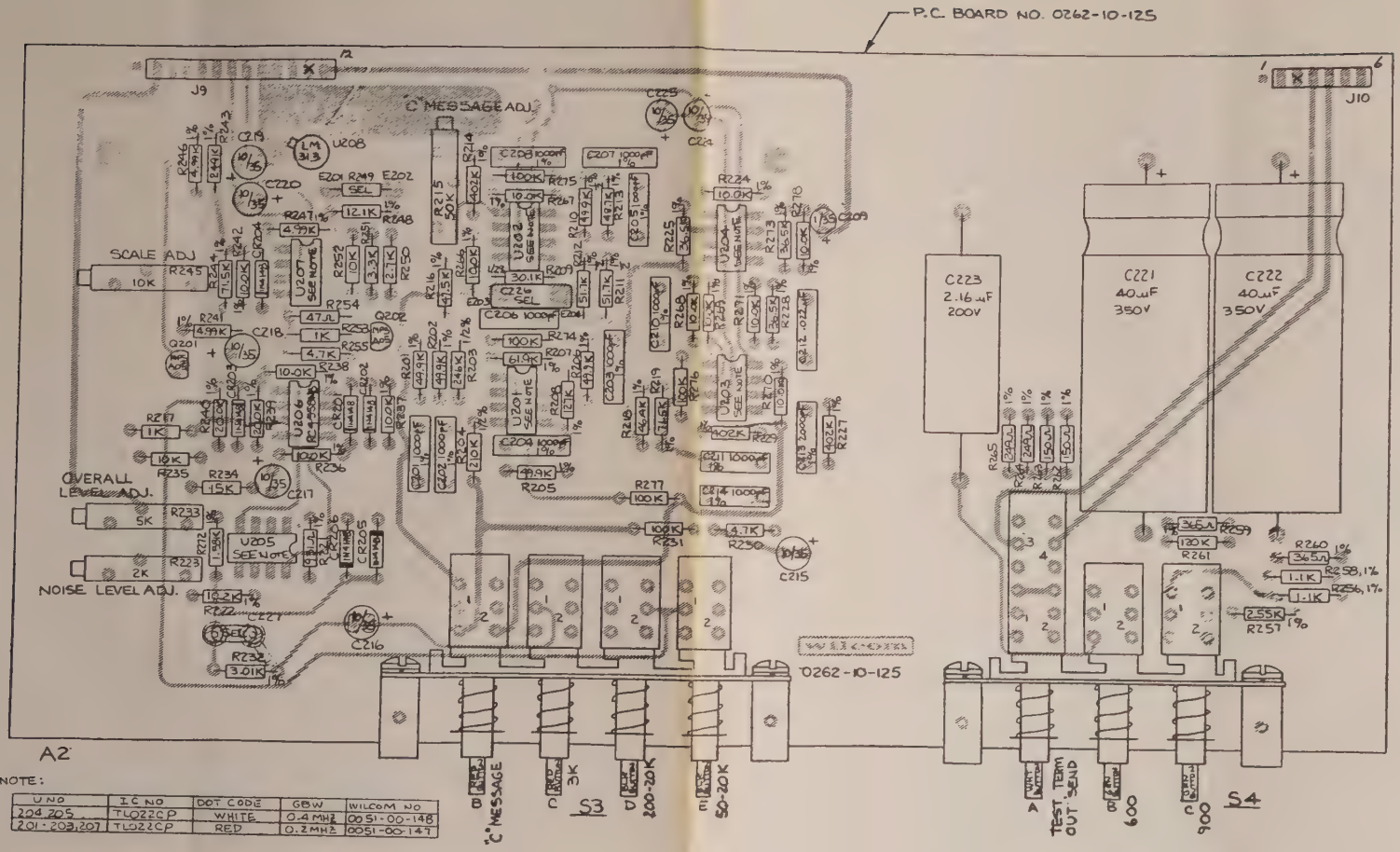


FIGURE 8-2
HOLD AND LINE
SELECT SCHEMATIC



NOTE:

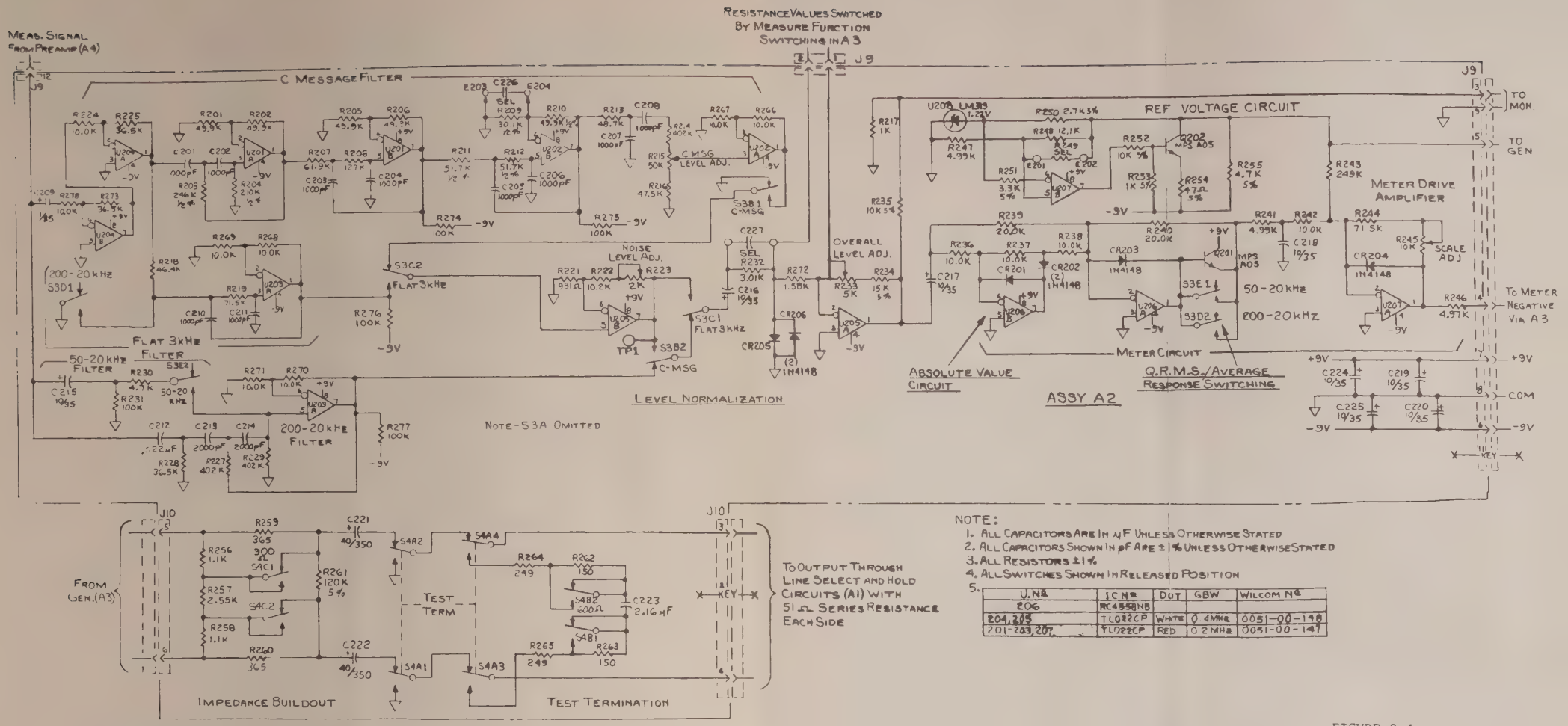
U NO	IC NO	DOT CODE	GBW	WILCOM NO
204,205	TL022CP	WHITE	0.4 MHz	0051-00-148
201-203,207	TL022CP	RED	0.2 MHz	0051-00-147

FIGURE 8-3

MEASURING AND OUTPUT

TERMINATION P.C. ASSEMBLY

(T262B)



NOTE:

1. ALL CAPACITORS ARE IN μF UNLESS OTHERWISE STATED
2. ALL CAPACITORS SHOWN IN pF ARE ± 1% UNLESS OTHERWISE STATED
3. ALL RESISTORS ± 1%
4. ALL SWITCHES SHOWN IN RELEASED POSITION
5.

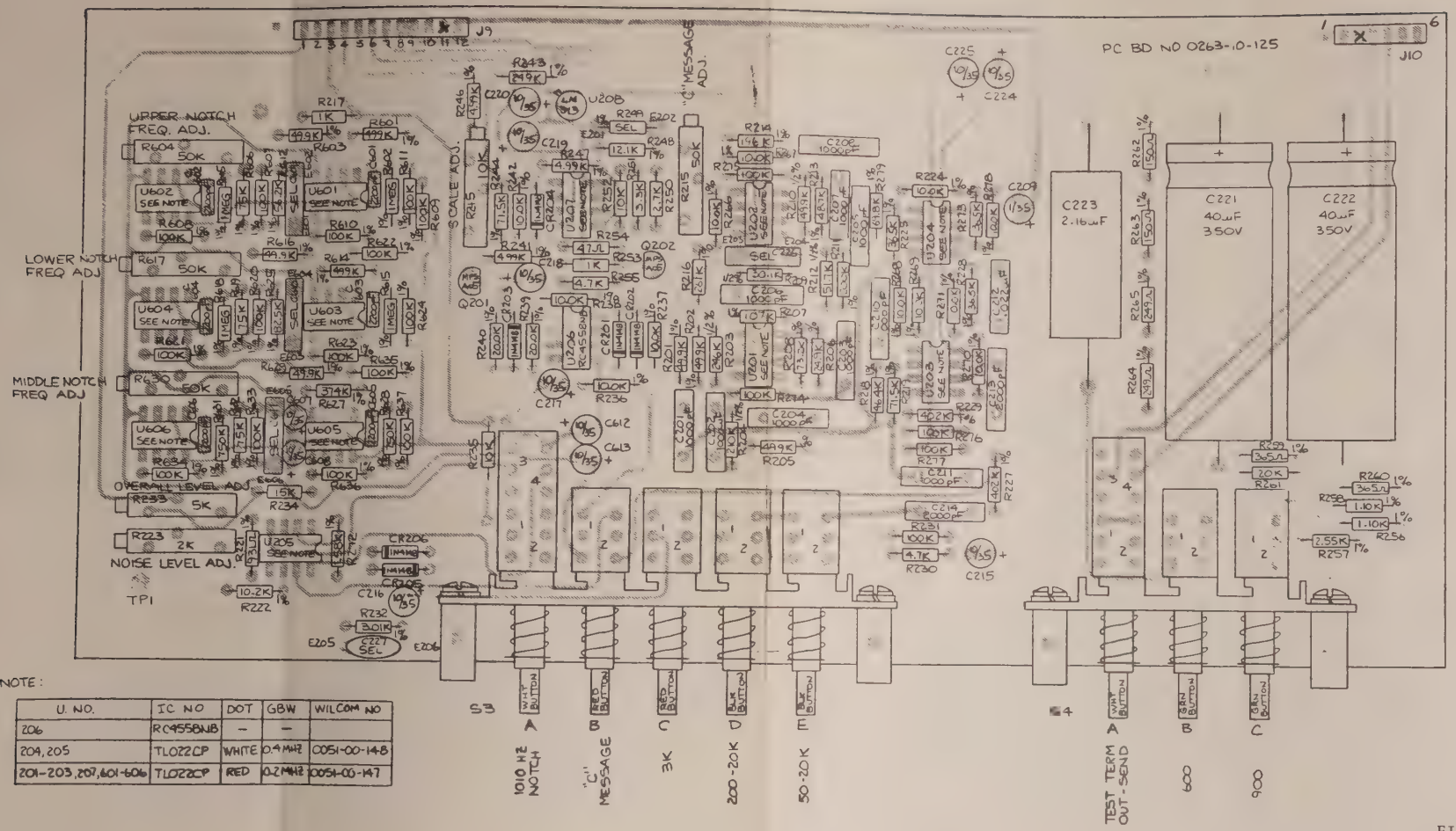
U.No	IC No	DUT	GBW	WILCOM No
206	RC4558NB			
204, 205	TL082CP	WHITE	0.4MHz	0051-00-148
201-203, 207	TL022CP	RED	0.2MHz	0051-00-147

FIGURE 8-4

MEASURING AND OUTPUT

TERMINATION SCHEMATIC

T262B)



NOTE :

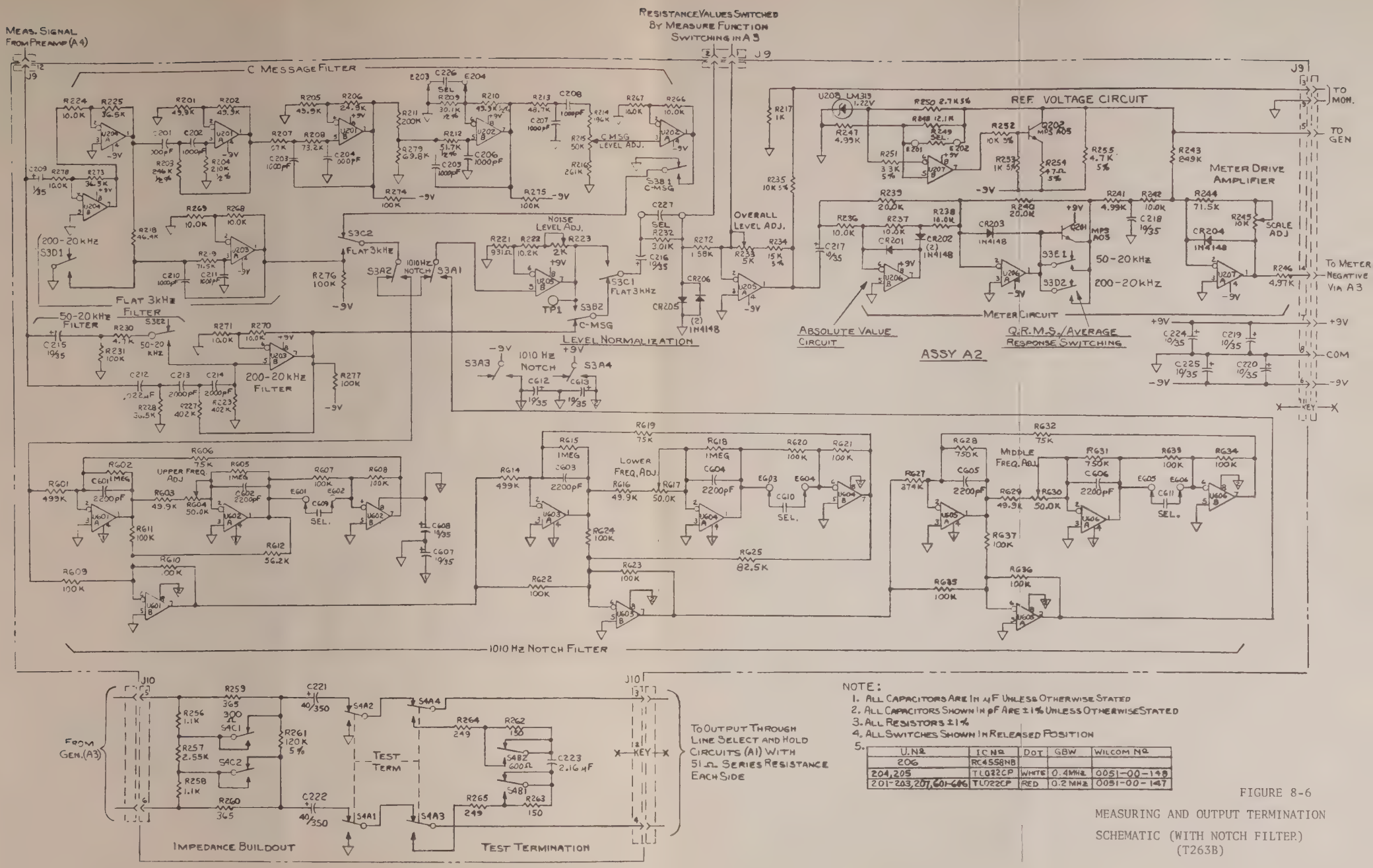
1.

U. NO.	IC NO	DOT	GBW	WILCOM NO
206	RC4558NB	–	–	
204, 205	TL022CP	WHITE	0.4 MHZ	0051-00-148
201-203, 207, 601-606	TL022CP	RED	0.2 MHZ	0051-00-147

FIGURE 8-5

MEASURING AND OUTPUT

TERMINATION P.C. ASSEMBLY
(T263B)



NOTE:

1. ALL CAPACITORS ARE IN μF UNLESS OTHERWISE STATED
2. ALL CAPACITORS SHOWN IN pF ARE ±1% UNLESS OTHERWISE STATED
3. ALL RESISTORS ±1%
4. ALL SWITCHES SHOWN IN RELEASED POSITION
5.

U.Nº	IC Nº	DOT	GBW	WILCOM Nº
206	RC4558NB			
204, 205	TL022CP	WHITE	0.4MHz	0051-00-148
201-203, 207, 601-606	TL022CP	RED	0.2 MHz	0051-00-147

FIGURE 8-6

MEASURING AND OUTPUT TERMINATION SCHEMATIC (WITH NOTCH FILTER) (T263B)

NOTE: U301 - TESTED TL022CP 0.3 MHZ GBW
WILCOM 0051-00-136 (YELLOW DOT)
U302 — TESTED TL022CP, 0.2 MHZ GBW
WILCOM 0051-00-147 (RED DOT)
U303 - RC4558NB

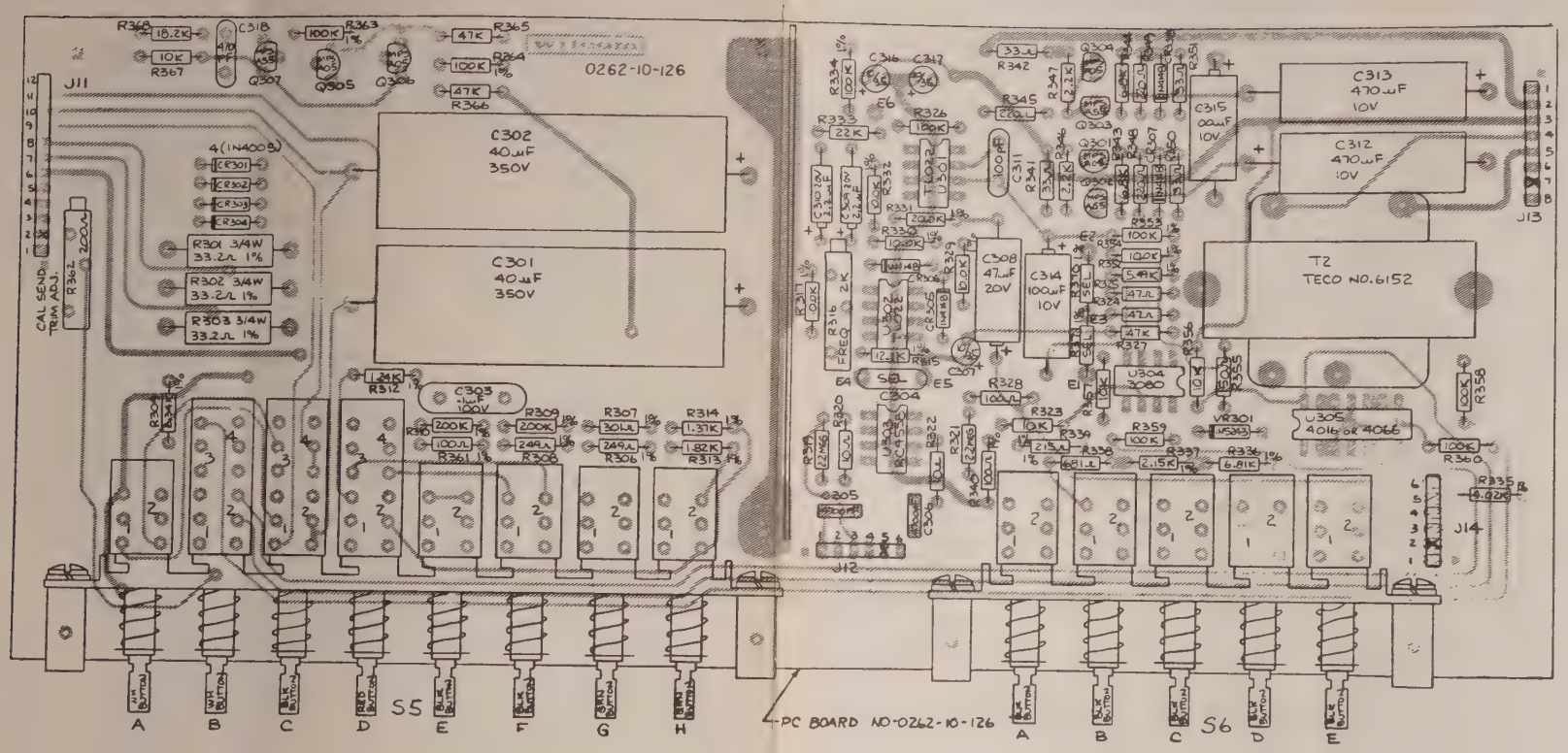


FIGURE 8-7
GENERATOR
P.C. ASSEMBLY

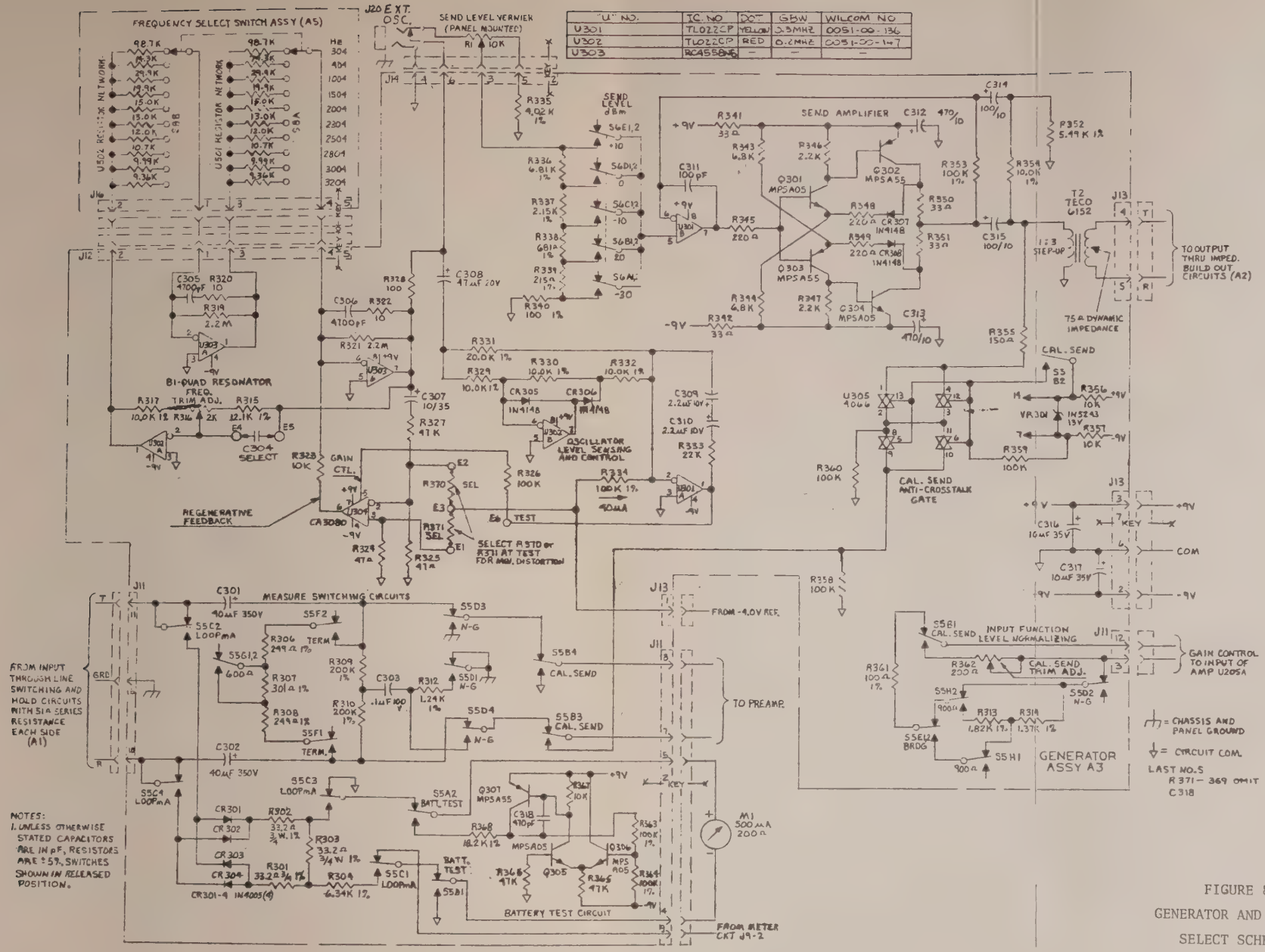

FREQUENCY SELECT SWITCH ASSY (A5)
J20 EXT. OSC.
SEND LEVEL VERNIER (PANEL MOUNTED)
R1 10K
"U" NO. | IC NO | DOT | GBW | WILCOM NO
U301 | TL022CP | YELLOW | 3.3MHZ | 0051-00-136
U302 | TL022CP | RED | 0.2MHZ | 0051-00-147
U303 | RC4558N | - | - | -
SEND LEVEL dBm
SEND AMPLIFIER
BI-QUAD RESONATOR FREQ. TRIM ADJ.
OSCILLATOR LEVEL SENSING AND CONTROL
REGENERATIVE FEEDBACK
GAIN CTL.
SELECT R37D or R37I AT TEST FOR MIN. DISTORTION
MEASURE SWITCHING CIRCUITS
FROM INPUT THROUGH LINE SWITCHING AND HOLD CIRCUITS WITH 51A SERIES RESISTANCE EACH SIDE (A1)
TO PREAMP.
FROM -4.0V REF.
CAL. SEND ANTI-CROSSTALK GATE
INPUT FUNCTION LEVEL NORMALIZING
GAIN CONTROL TO INPUT OF AMP U205A
GENERATOR ASSY A3
BATTERY TEST CIRCUIT
FROM METER CKT J9-2
TO OUTPUT THRU IMPED. BUILD OUT CIRCUITS (A2)
75Ω DYNAMIC IMPEDANCE
= CHASSIS AND PANEL GROUND
= CIRCUIT COM.
LAST NO.S R 371 – 369 OMIT C 318
NOTES:
1. UNLESS OTHERWISE STATED CAPACITORS ARE IN pF, RESISTORS ARE ±5%, SWITCHES SHOWN IN RELEASED POSITION.

FIGURE 8-8
GENERATOR AND FREQUENCY
SELECT SCHEMATIC

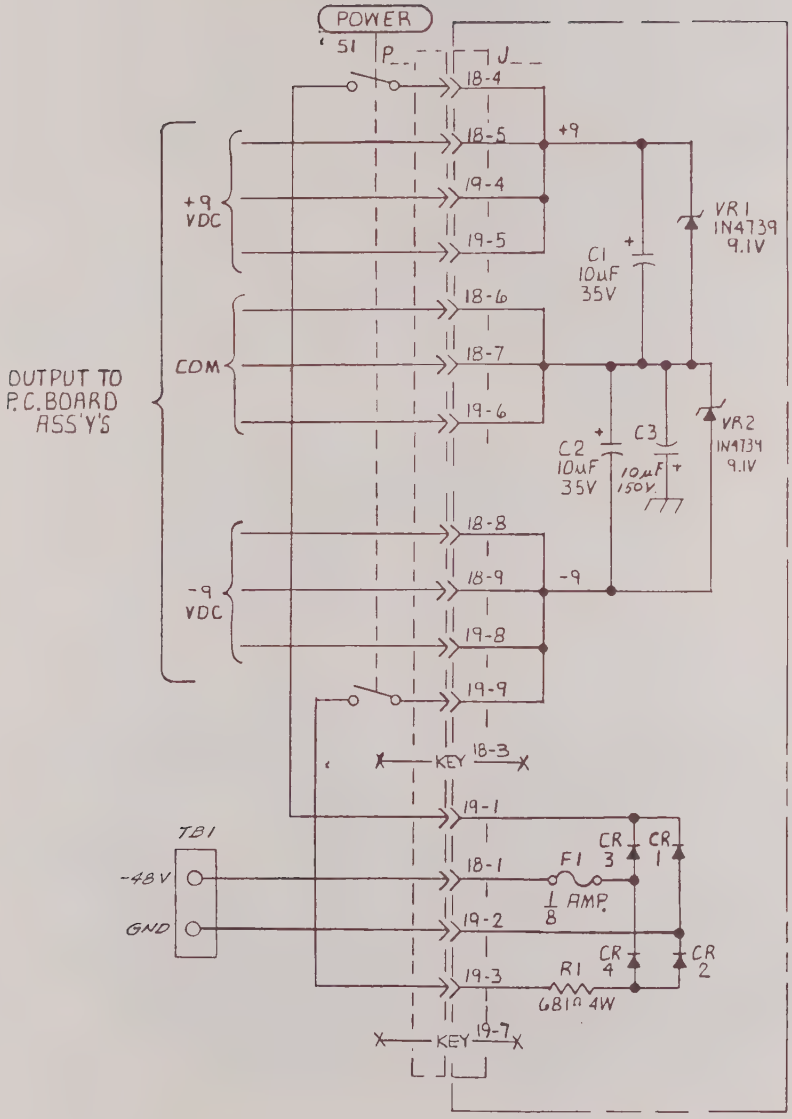


FIGURE 8-9

POWER SUPPLY
(C.O. BATTERY)

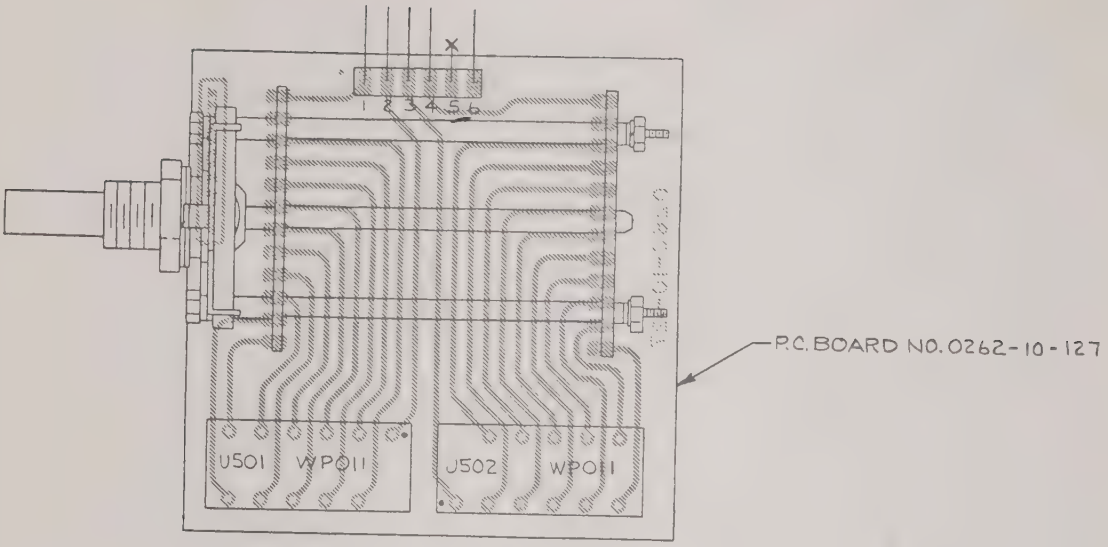


FIGURE 8-10

FREQUENCY SELECT P.C. ASSEMBLY

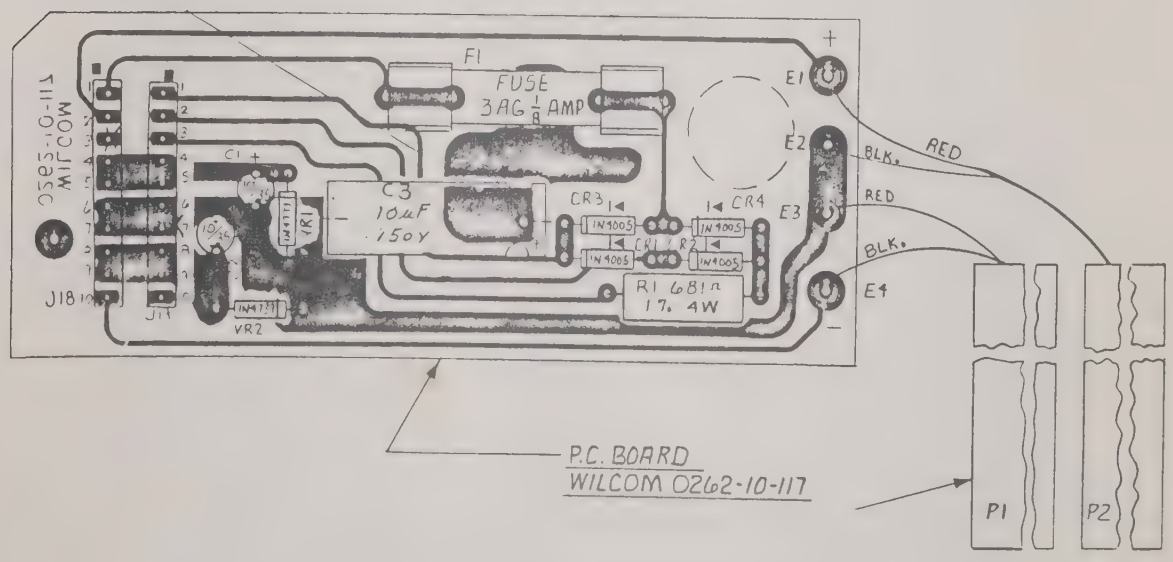


FIGURE 8-11

POWER SUPPLY P.C. ASSEMBLY

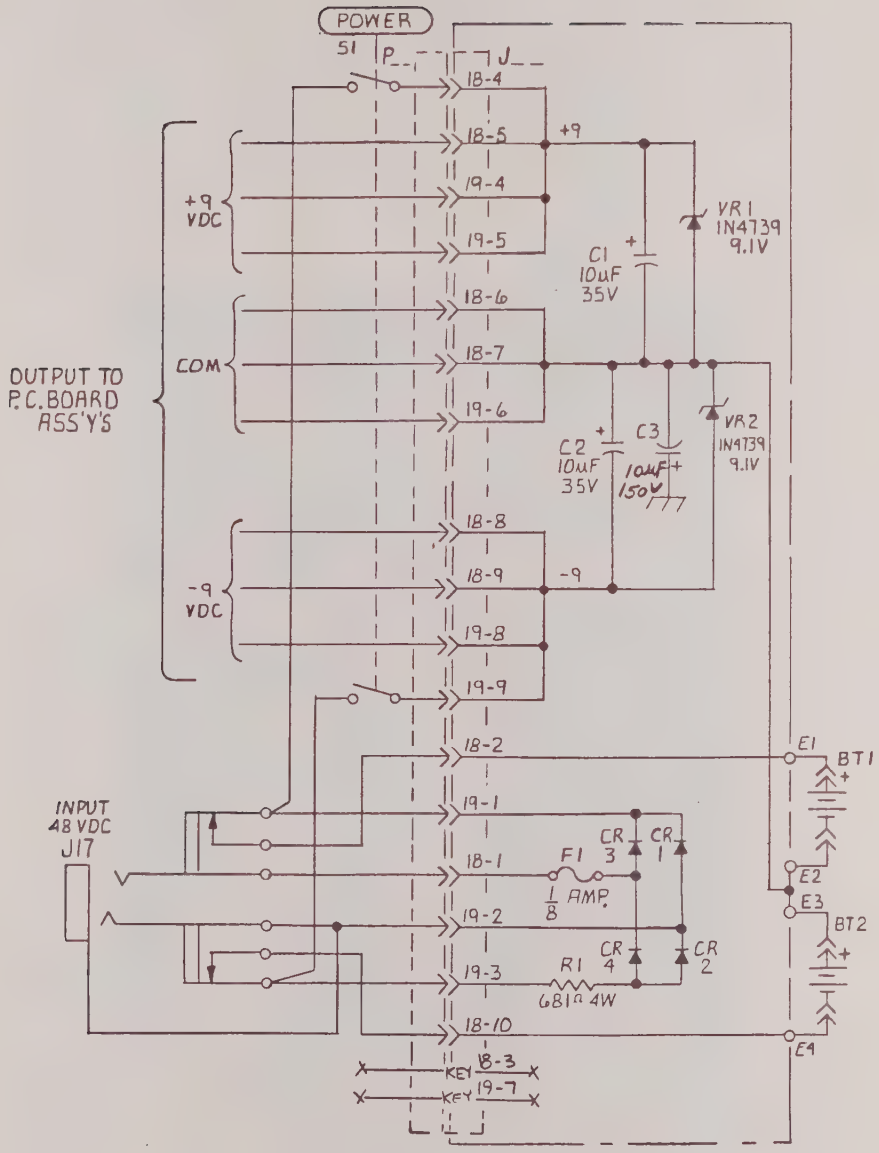


FIGURE 8-12

POWER SUPPLY
(9V Batteries)

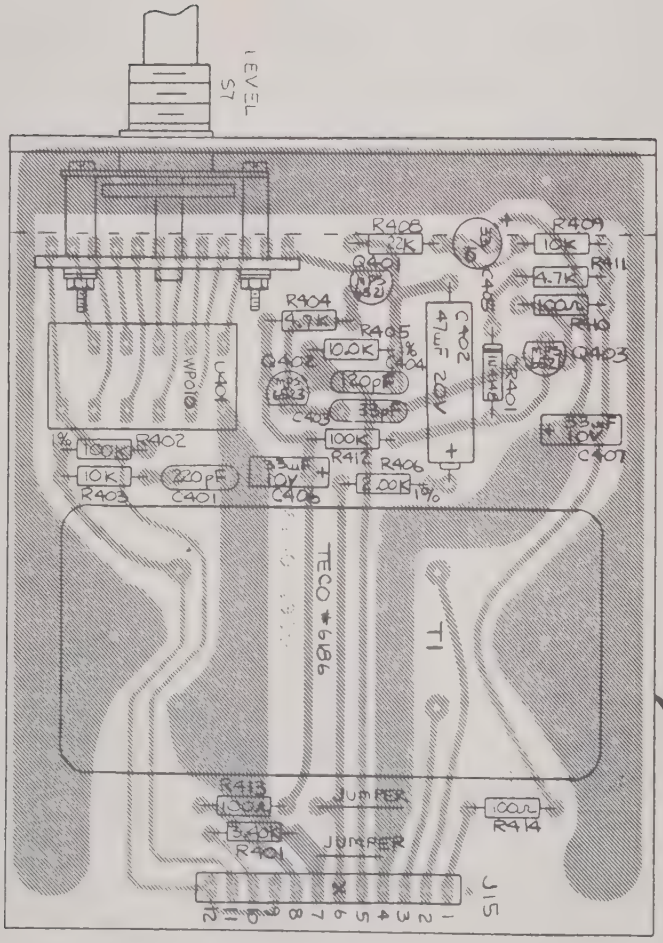


FIGURE 8-13

PREAMPLIFIER P.C. ASSEMBLY

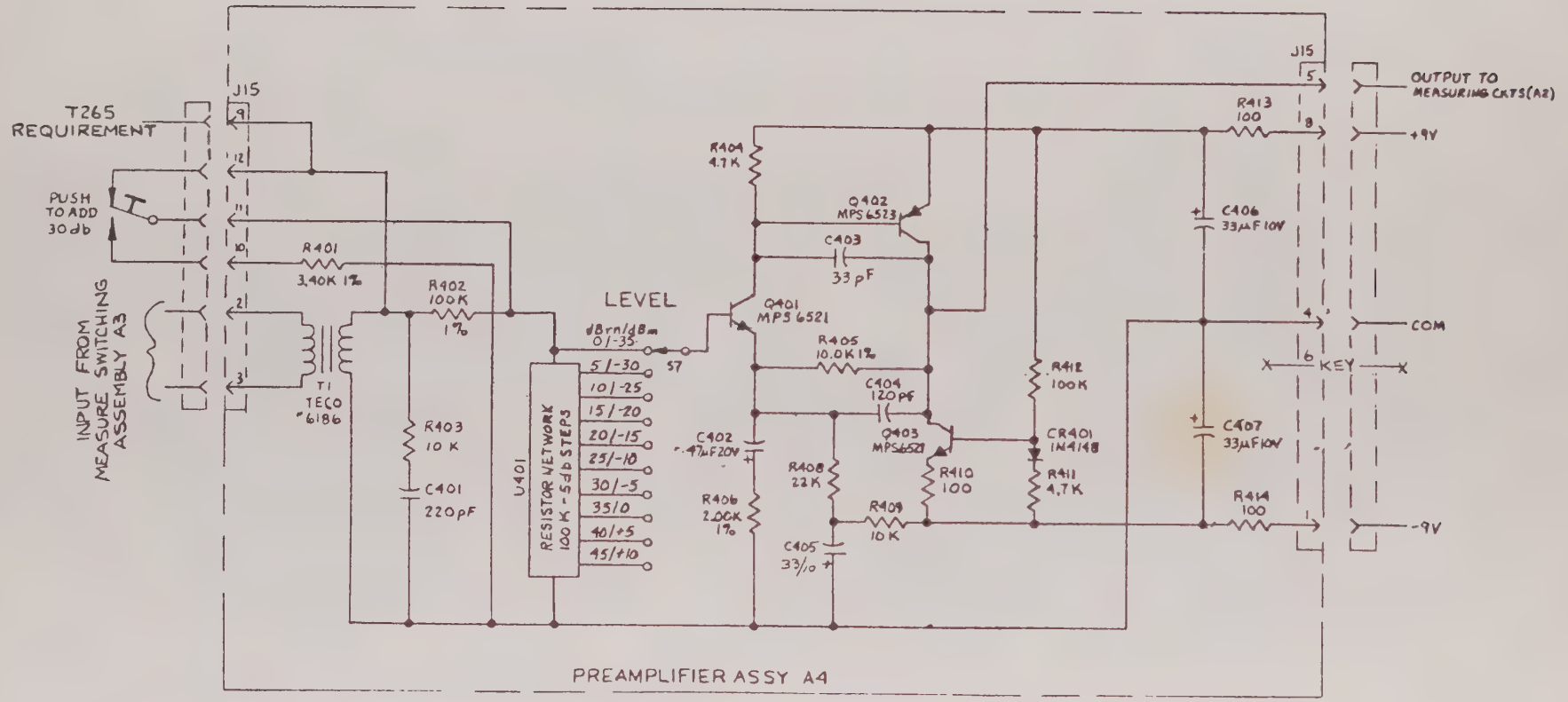


FIGURE 8-14

PREAMPLIFIER SCHEMATIC

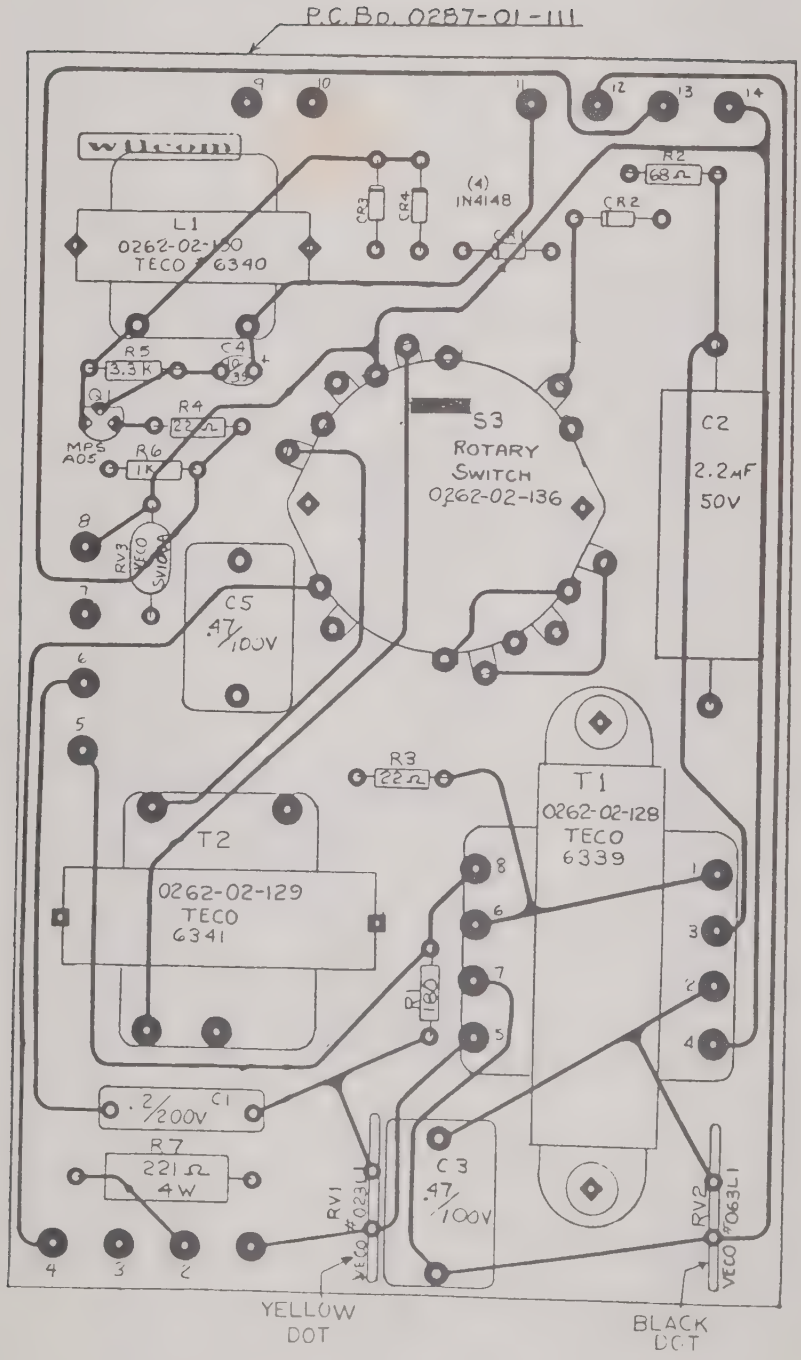


FIGURE 8-15

P.C. ASSEMBLY TALK CIRCUIT

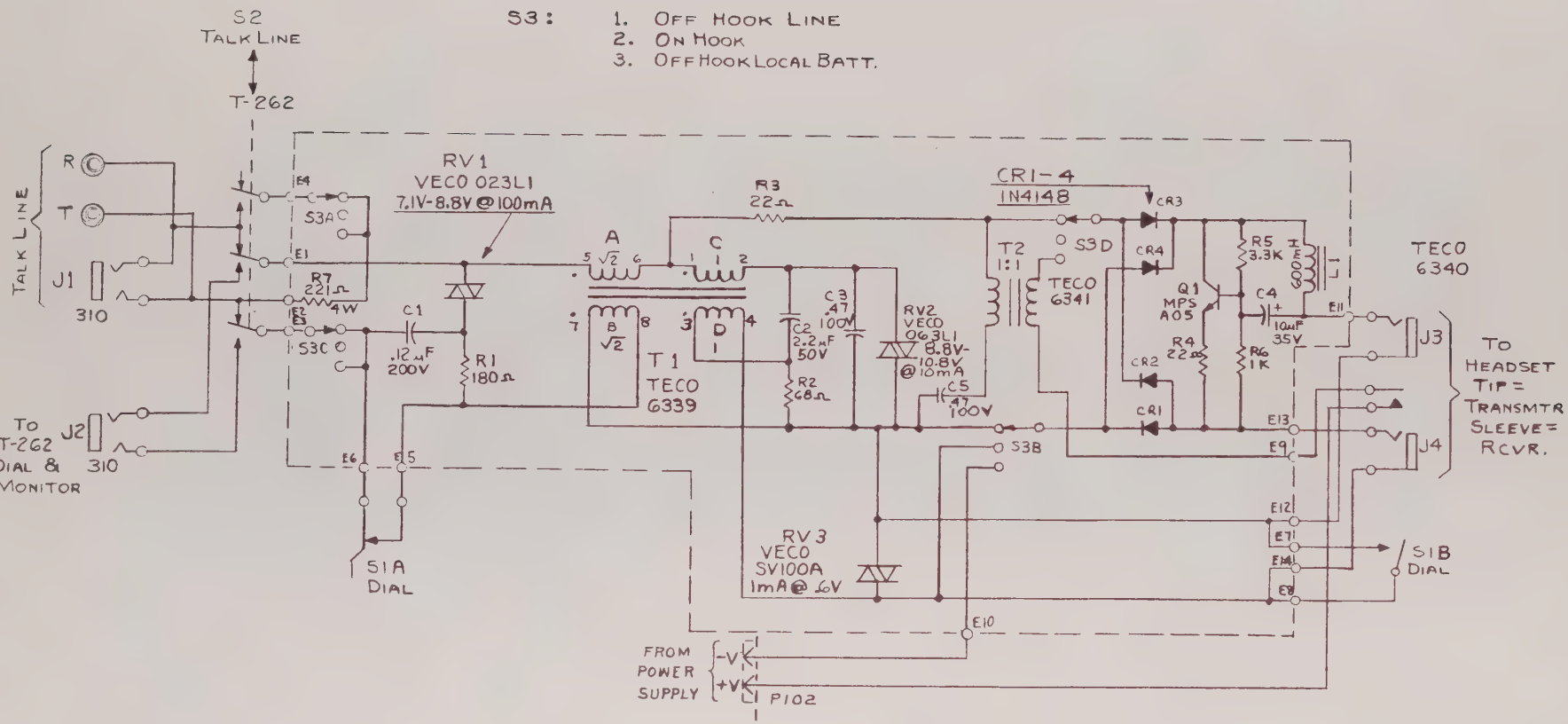


FIGURE 8-16

TALK CIRCUIT COVER SCHEMATIC

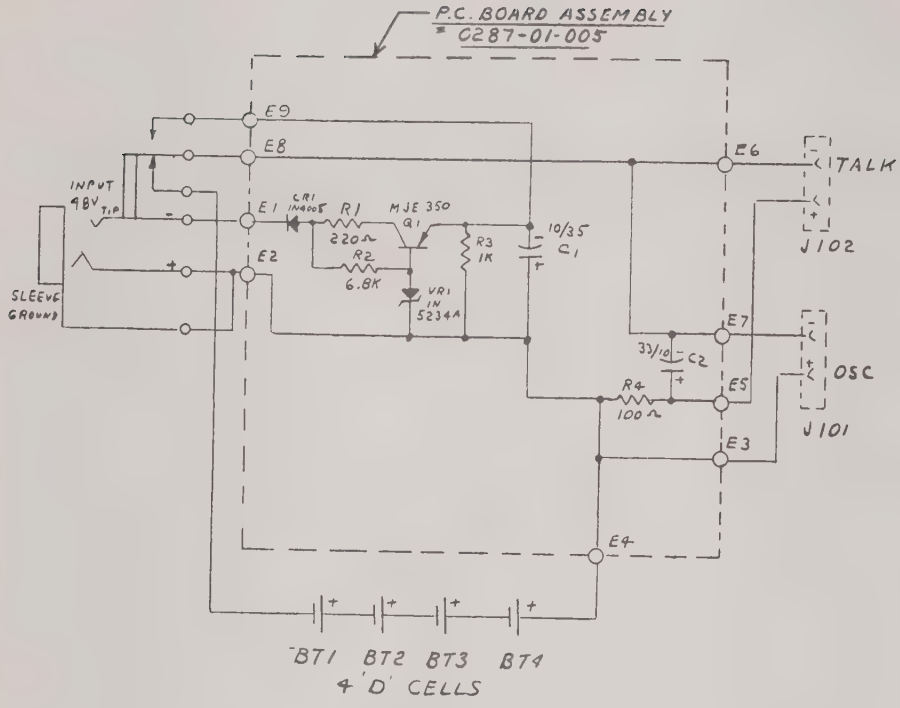


FIGURE 8-17

POWER SUPPLY SCHEMATIC
(ACCESSORY COVER)

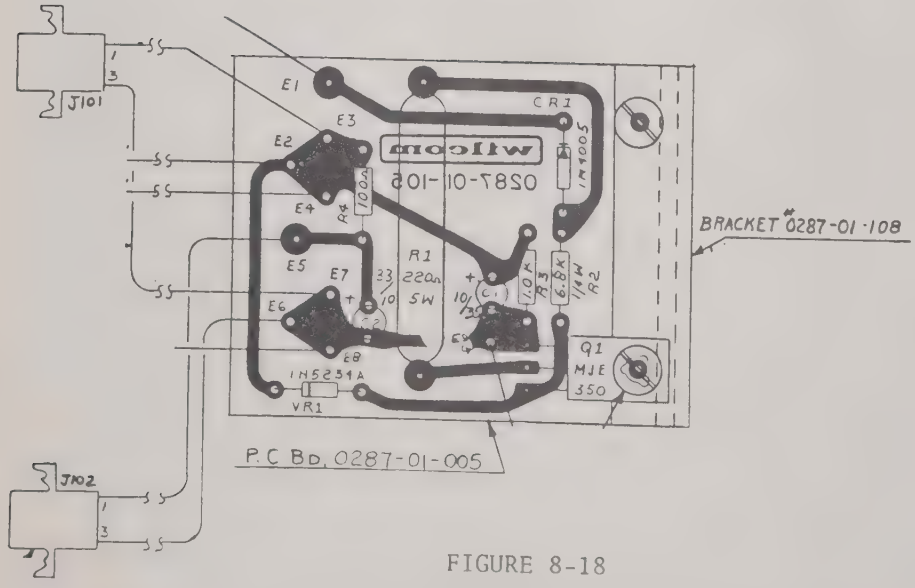


FIGURE 8-18

P.C. ASSEMBLY POWER SUPPLY
(ACCESSORY COVER)

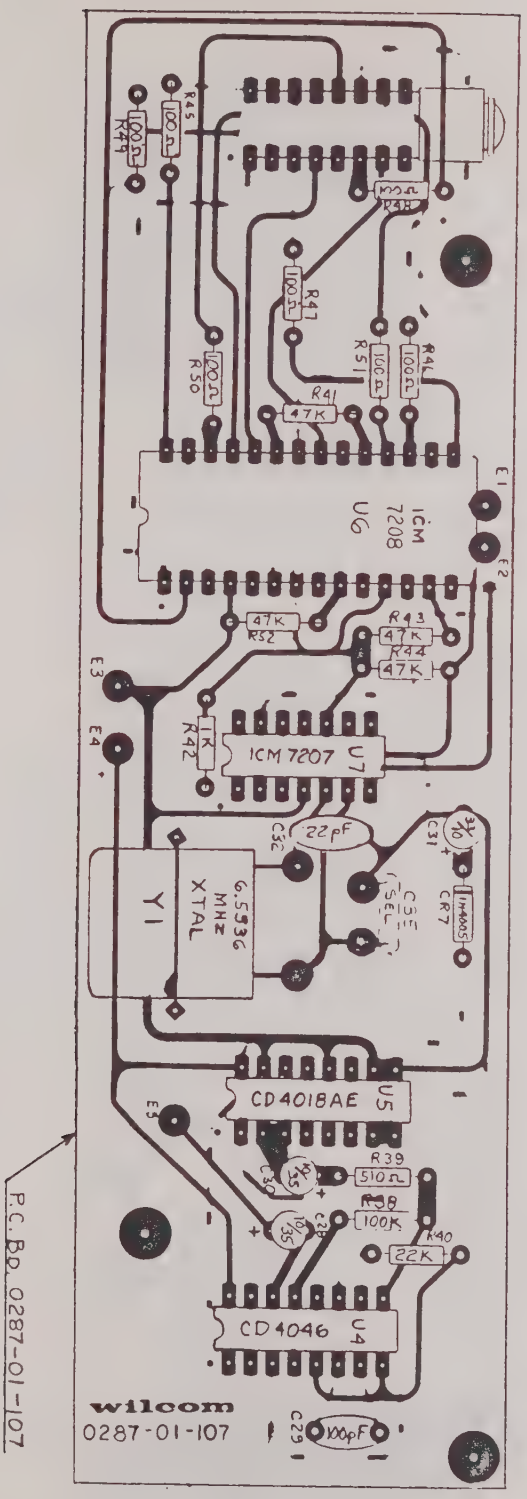


FIGURE 8-19

P.C. ASSEMBLY DISPLAY

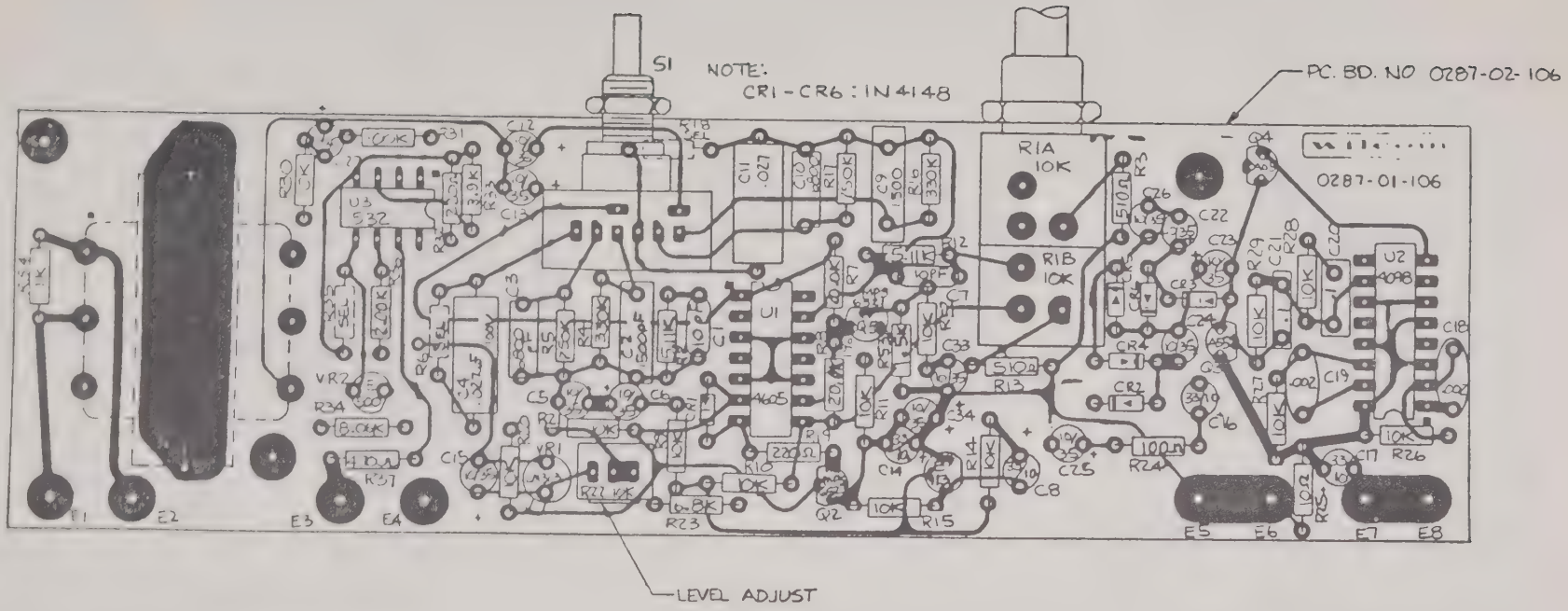


FIGURE 8-20

P.C. ASSEMBLY OSCILLATOR

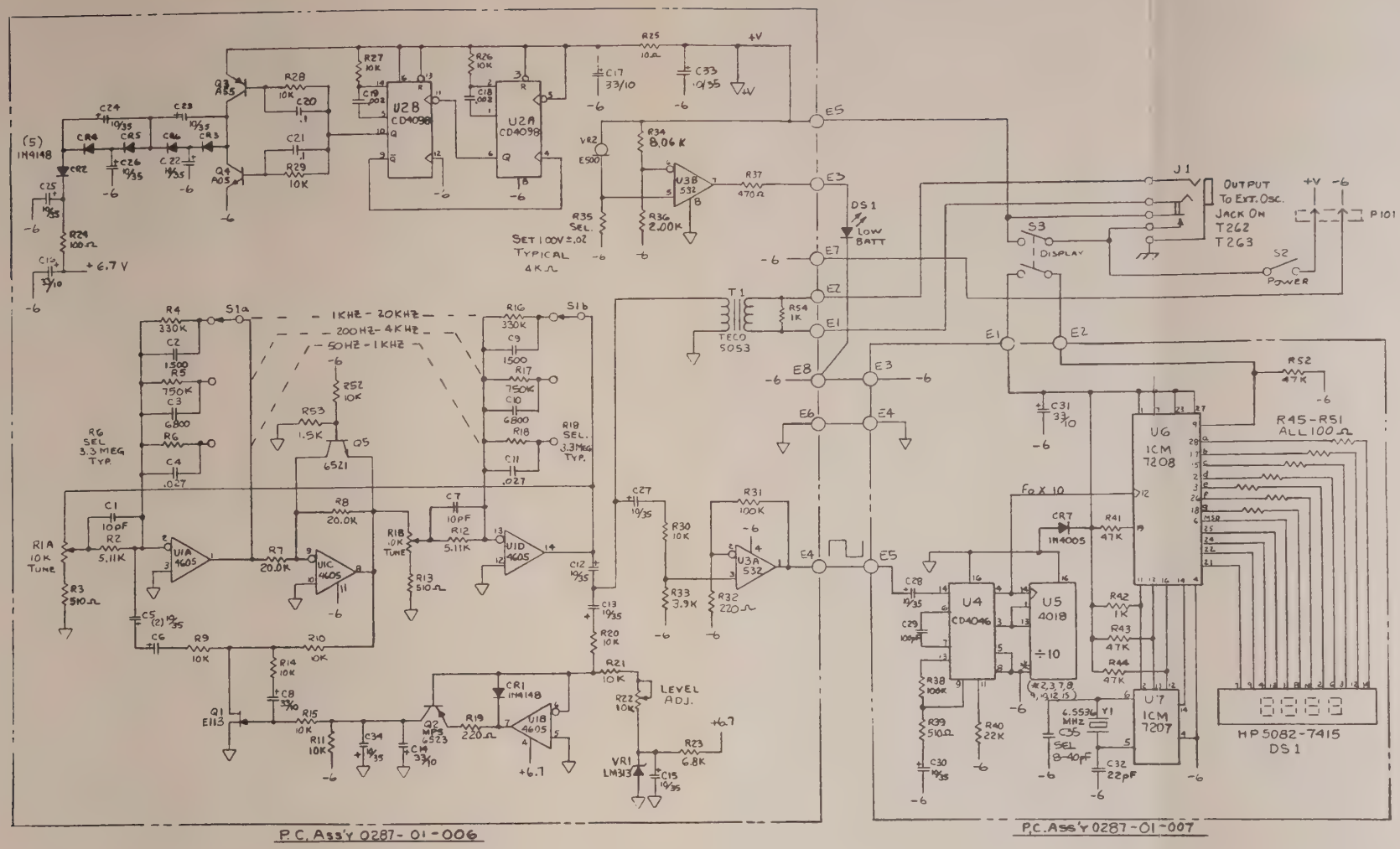


FIGURE 8-21
OSCILLATOR AND DISPLAY
SCHEMATIC

9.0 PARTS LIST

9.1 General

9.1.01 The Parts Lists provided on the following pages supply the description of the various assemblies, sub-assemblies and components that make up the Model T262B/T263B Transmission and Noise Measuring Set as well as the T287 Cover Options.

9.1.02 For those components purchased by Wilcom, the manufacturer and manufacturer's part number are provided. Those components manufactured by Wilcom are identified by a Wilcom part number.

9.1.03 Any required items may be ordered direct from Wilcom Products, Inc. or the manufacturer.

PARTS LIST

TRANSMISSION AND NOISE TEST SET

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
	FRONT PANEL ASSEMBLY T262B	1	Wilcom	0262-10-001
	FRONT PANEL ASSEMBLY T263B	1	Wilcom	0263-10-001
	CASE ASSEMBLY	1	Wilcom	0115-00-299
	COVER ASSEMBLY	1	Wilcom	0262-10-098

FRONT PANEL ASSEMBLY & WIRING T262B/T263B

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
	PANEL (Panel Detail 0262-02-100)	1	Wilcom	0262-10-101
A1,J6	P.C. ASSEMBLY, HOLD & LINE SELECT	1	Wilcom	0262-10-024
A5	P.C. ASSEMBLY, FREQUENCY SELECT	1	Wilcom	0262-10-027
A4	P.C. ASSEMBLY, PREAMPLIFIER	1	Wilcom	0262-01-032
A2 (T262B)	P.C. ASSEMBLY, MEASURING & OUT TERM	1	Wilcom	0262-10-025
A2 (T263B)	P.C. ASSEMBLY, MEASURING & OUT TERM	1	Wilcom	0263-10-025
A3	P.C. ASSEMBLY, GENERATOR	1	Wilcom	0262-10-026
A6	P.C. ASSEMBLY, POWER SUPPLY	1	Wilcom	0262-10-017
P12,16	P12 AND P16 ASSEMBLY	1	Wilcom	0262-10-028
	Housing	2	Amp	1-87175-3
	Contact	8	Amp	87165-2
	Keying Device	2	Amp	87179-1
R1,P14	SEND LEVEL VERNIER ASSEMBLY	1	Wilcom	0262-10-029
R1	Pot, 1 turn, ±10%, 1/2W, 10 k	1	Al. Brad.	WA2G056S103UA
P14	Housing	1	Amp	1-87175-3
	Contact	4	Amp	87165-2
	Keying Device	1	Amp	87179-1
J20	Jack	1	Switchcraft	13B
J2,P5	LINE "A" JACK ASSEMBLY	1	Wilcom	0262-01-010
	Jack	1	Switchcraft	12B
	Housing	1	Amp	1-87175-0
	Contact	4	Amp	87165-2
	Keying Device	1	Amp	87179-1
J3,P7	LINE "B" JACK ASSEMBLY	1	Wilcom	0262-01-011
	Jack	1	Switchcraft	12B
	Housing	1	Amp	1-87175-0
	Contact	4	Amp	87165-2
	Keying Device	1	Amp	87179-1
J1,P4	DIAL & MONITOR JACK ASSEMBLY	1	Wilcom	0262-01-012
	Jack	1	Switchcraft	12B
	Housing	1	Amp	1-87175-0
	Contact	4	Amp	87165-2
	Keying Device	1	Amp	87179-2

PARTS LIST

FRONT PANEL ASSEMBLY & WIRING continued

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
P8-11,13 15,18,19	WIRING HARNESS ASSEMBLY	1	Wilcom	0262-10-034
	Wiring Harness	1	Wilcom	0262-10-033
	Receptacle	1	Amp	42718-2
P8,10	Housing, 6 pin	2	Amp	1-87175-3
P13	Housing, 8 pin	1	Amp	1-87175-7
P18,19	Housing, 10 pin	2	Amp	2-87175-1
P9,11,15	Housing, 12 pin	3	Amp	2-87175-5
	Contact	61	Amp	87165-2
	Keying Device	8	Amp	87179-1
	Heat Shrink Tubing	3"	Alpha	FIT 221 x 1/8
M1	METER (Scale #34041-1,2)	1	Wilcom	0262-01-125B
BT1,2	BATTERY, 9V	2	Eveready 276	
	KNOB	2	Buckeye	PS-70-BL2
	KNOB	1	Buckeye	PS-70D-1
S1	SWITCH, Toggle, DPDT	1	C-H	8360K7
S9	SWITCH	1	Switchcraft	903
	HANDLE	2	Bud	H-9111
	BRACKET ASSEMBLY, Right Hand	1	Wilcom	0262-01-036
	BRACKET ASSEMBLY, Left Hand	1	Wilcom	0262-01-037
	BRACKET BATTERY TRAY	1	Wilcom	0262-01-101
	BRACKET, BATTERY CLAMPING	1	Wilcom	0262-01-102
	BINDING POST, Black	4	Grayhill	29-1B
	BINDING POST, Red	2	Grayhill	29-1R
	DIAL POST	2	Wilcom	0132-10-132
	SHOULDER WASHER, Nylon	4	H.H. Smith	2663
	FUSE 3AG, 1/8A Normal Blo	1	Littlefuse	312.125
	FUSE CLIP	1	Bussman	4405

PARTS LIST

P.C. ASSEMBLY — HOLD & LINE SELECT CIRCUIT (A1)

Ref. Desig.	Description		Qty.	Mfr.	Manufacturer's Number
	Printed Circuit Board		1	Wilcom	0262-10-124
R111,123	RESISTOR, ±1%, 3/4W	16.5 ohm	2	TRW/IRC	T060
R101,102, 113,114	RESISTOR, ±1%, 3/4W	24.9 ohm	4	TRW/IRC	T060
R103,106 115,118	RESISTOR, ±1%, 3/4W	24.9 ohm	4	TRW/IRC	T060
R104,105, 110,116, 117,122	RESISTOR, ±5%, 1/4W	100 ohm	6	TRW/IRC	RG-1/4
R112,124	RESISTOR, ±5%, 1/4W	1 k	2	TRW/IRC	RG-1/4

PARTS LIST

P.C. ASSEMBLY — HOLD & LINE SELECT CIRCUIT (A1)

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
R109,121	RESISTOR, ±5%, 1/4W 47 k	2	TRW/IRC	RG-1/4
R108,120	RESISTOR, ±1%, 1/4W 35.7 k	2	TRW/IRC	T055
R107,119	RESISTOR, ±1%, 1/4W 100 k	2	TRW/IRC	T055
RV101,102	VARISTOR	2	G.E.	V130LA10A
C101,102	CAPACITOR, Alum. Elect., 16V, 100 uF	2	Sprague	502D107G016CD1C
C103,104	CAPACITOR, 10%, .047/100	2	Sprague	225P47291WD3
C105	CAPACITOR, Alum. Elect. ±20%, 150V	1	Sprague	TVA1406
C106	CAPACITOR, RADIALMPE, 200V .22uF	1	Paktron	224K02WC687
CR101-106 108-113	DIODE, 1A Sil. Rect.	12		1N4005
Q101-103 106-108 111,112	TRANSISTOR, Sil. G.P. PNP	8	Motorola	MPS A55
Q104,109	TRANSISTOR, Sil High V PNP	2	Motorola	MPS A92
Q105,110	TRANSISTOR, Sil. Pwr. NPN	2	Motorola	MJE 340
J4,5,7	HEADER, Straight Post, .10ctr	3	Amp	87348-4
J8	HEADER, Straight Post, .10ctr	1	Amp	87348-6
S2	SWITCH, Centralab Pushbutton, Hold and Line Select, 6 pos.	1	Wilcom	0262-10-111
	HEAT SINK	2	IERC	PSB2-IND
	SHIELD	1	Wilcom	0262-10-132
	SHIELD FIN	1	Wilcom	0221-01-119
	SPACER	2	Wilcom	0051-00-139

PARTS LIST

P.C. ASSEMBLY — MEASURING & OUTPUT TERM. T262B (A2)

Ref. Desig.	Description		Qty.	Mfr.	Manufacturer's Number
	Printed Circuit Board		1	Wilcom	0262-10-125
R209	RESISTOR, ±1/2%, 1/4W	30.1 k	1	TRW/IRC	T055
R210	RESISTOR, ±1/2%, 1/4W	49.9 k	1	TRW/IRC	T055
R211,212	RESISTOR, ±1/2%, 1/4W	51.7 k	2	TRW/IRC	T055
R204	RESISTOR, ±1/2%, 1/4W	210 k	1	TRW/IRC	T055
R203	RESISTOR, ±1/2%, 1/4W	246 k	1	TRW/IRC	T055
R262,263	RESISTOR, ±1%, 1/4W	150 ohm	2	TRW/IRC	T055
R264,265	RESISTOR, ±1%, 1/4W	249 ohm	2	TRW/IRC	T055
R259,260	RESISTOR, ±1%, 1/4W	365 ohm	2	TRW/IRC	T055
R221	RESISTOR, ±1%, 1/4W	931 ohm	1	TRW/IRC	T055
R256,258	RESISTOR, ±1%, 1/4W	1.1 k	2	TRW/IRC	T055
R272	RESISTOR, ±1%, 1/4W	1.58 k	1	TRW/IRC	T055
R257	RESISTOR, ±1%, 1/4W	2.55 k	1	TRW/IRC	T055
R246,247, 241	RESISTOR, ±1%, 1/4W	4.99 k	3	TRW/IRC	T055
R224,242, 236,237, 238,266, 268,269, 270,271, 267,278	RESISTOR, ±1%, 1/4W	10 k	12	TRW/IRC	T055
R248	RESISTOR, ±1%, 1/4W	12.1 k	1	TRW/IRC	T055
R239,240	RESISTOR, ±1%, 1/4W	20 k	2	TRW/IRC	T055
R228,225, 273	RESISTOR, ±1%, 1/4W	36.5 k	3	TRW/IRC	T055
R218	RESISTOR, ±1%, 1/4W	46.4 k	1	TRW/IRC	T055
R216	RESISTOR, ±1%, 1/4W	47.5 k	1	TRW/IRC	T055
R213	RESISTOR, ±1%, 1/4W	48.7 k	1	TRW/IRC	T055
R201,202 205,206	RESISTOR, ±1%, 1/4W	49.9 k	4	TRW/IRC	T055
R207	RESISTOR, ±1%, 1/4W	61.9 k	1	TRW/IRC	T055
R244,219	RESISTOR, ±1%, 1/4W	71.5 k	2	TRW/IRC	T055
R232	RESISTOR, ±1%, 1/4W	3.01 k	1	TRW/IRC	T055
R208	RESISTOR, ±1%, 1/4W	127 k	1	TRW/IRC	T055
R243	RESISTOR, ±1%, 1/4W	249 k	1	TRW/IRC	T055
R214,229, 227	RESISTOR, ±1%, 1/4W	402 k	3	TRW/IRC	T055
R222	RESISTOR, ±1%, 1/4W	10.2 k	1	TRW/IRC	T055
R217,249	RESISTOR,	SEL	2	TRW/IRC	T055
R254	RESISTOR, ±5%, 1/4W	47 ohm	1	TRW/IRC	RG-1/4
R253,217	RESISTOR, ±5%, 1/4W	1 k	2	TRW/IRC	RG-1/4
R250	RESISTOR, ±5%, 1/4W	2.7 k	1	TRW/IRC	RG-1/4
R251	RESISTOR, ±5%, 1/4W	3.3 k	1	TRW/IRC	RG-1/4
R255,230	RESISTOR, ±5%, 1/4W	4.7 k	2	TRW/IRC	RG-1/4
R235,252	RESISTOR, ±5%, 1/4W	10 k	2	TRW/IRC	RG-1/4

P.C. ASSEMBLY — MEASURING & OUTPUT TERM. T262B (A2) continued

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
R234	RESISTOR, ±5%, 1/4W 15 k	1	TRW/IRC	RG-1/-
R231,274, 275,276, 277	RESISTOR, ±5%, 1/4W 100 k	5	TRW/IRC	RG-1/4
R261	RESISTOR, ±5%, 1/4W 120 k	1	TRW/IRC	RG-1/4
R223	POT, ±10%, 3/4W 2 k	1	Bourns	3009P-1-202
R233	POT, ±10%, 3/4W 5 k	1	Bourns	3009P-1-502
R245	POT, ±10%, 3/4W 10 k	1	Bourns	3009P-1-103
R215	POT, ±10%, 3/4W 50 k	1	Bourns	3009P-1-503
C219,220 216,215, 217,218, 224,225	CAPACITOR, Tant., ±10%, 35V 10 uF	8	ITT	GA010G100
C201,202 203,204, 205,206, 207,208, 210,211	CAPACITOR, Mica, ±1%, 100V 1000 pF	10	Elmenco	DM19FA102F04CR
C213,214	CAPACITOR, Mica, ±1%, 500V 2000 pF	2	Elmenco	DM19FA202F04CR
C212	CAPACITOR, Film, ±10%, 100V.022 uF	1	Sprague	225P22391WD3
C221,222	CAPACITOR, Al. Elect., +50/-10%, 350V 40 uF	2	Sprague	39D406F350GL4
C223	CAPACITOR, Film, ±5%, 200V 2.15 uF	1	F-Dyne	MPE21-2.16-200-5
C226,227	CAPACITOR, Disc SEL	2	Erie	
C209	CAPACITOR, Tant ±20%, 25V 1.0 uF	1	ITT	TAG-A1.0K35
U201,202 203,207	IC, Dual Op. Amp. (TL022P-red dot)	4	Wilcom	0051-00-147
U204,205	IC, Dual Op. Amp. (T1022P-white dot)	2	Wilcom	0051-00-148
U206	IC, Dual Op. Amp	1	Raytheon	RC4558NB
Q201,202	TRANSISTOR, Silicon	2	Motorola	MPS-A05
CR201,202 203,204, 205,206	DIODE, Sil. Sm. Sig	6		1N4148
U208	DIODE, Voltage Reference	1	National	LM313H
S3	SWITCH, Centralab Pushbutton, 4 pos., weighting	1	Wilcom	0262-01-117
S4	SWITCH, Centralab Pushbutton, 3 pos. Out Imped.	1	Wilcom	0262-01-115
	SPACERS	4	Wilcom	0051-00-139
	ANGLE BRACKET	4	Federal S.	36-510
	MOUNTING SPACER	1	Bivar	104-060
J9	HEADER, Straight Post, 12 pos.	1	Amp	1-87348-2
J10	HEADER, Straight Post, 6 pos.	1	Amp	87348-6

PARTS LIST

P.C. ASSEMBLY — MEASURING & OUTPUT TERM. T263B (A2)

Ref. Disg.	Description		Qty.	Mfr.	Manufacturer's Number
	Printed Circuit Board		1	Wilcom	0263-10-125
R209	RESISTOR, ±1/2%, 1/4W	30.1 k	1	TRW/IRC	T055
R210	RESISTOR, ±1/2%, 1/4W	49.9 k	1	TRW/IRC	T055
R212	RESISTOR, ±1/2%, 1/4W	51.7 k	1	TRW/IRC	T055
R204	RESISTOR, ±1/2%, 1/4W	210 k	1	TRW/IRC	T055
R203	RESISTOR, ±1/2%, 1/4W	246 k	1	TRW/IRC	T055
R262,263	RESISTOR, ±1%, 1/4W	150 ohm	2	TRW/IRC	T055
R264,265	RESISTOR, ±1%, 1/4W	249 ohm	2	TRW/IRC	T055
R259,260	RESISTOR, ±1%, 1/4W	365 ohm	2	TRW/IRC	T055
R221	RESISTOR, ±1%, 1/4W	931 ohm	1	TRW/IRC	T055
R256,258	RESISTOR, ±1%, 1/4W	1.1 k	2	TRW/IRC	T055
R272	RESISTOR, ±1%, 1/4W	1.58 k	1	TRW/IRC	T055
R257	RESISTOR, ±1%, 1/4W	2.55 k	1	TRW/IRC	T055
R232	RESISTOR, ±1%, 1/4W	3.01 k	1	TRW/IRC	T055
R241,246, 247	RESISTOR, ±1%, 1/4W	4.99 k	3	TRW/IRC	T055
R224,236, 237,238, 242,266, 267,268, 269,270, 271,278	RESISTOR, ±1%, 1/4W	10 k	12	TRW/IRC	T055
R222	RESISTOR, ±1%, 1/4W	10.2 k	1	TRW/IRC	T055
R248	RESISTOR, ±1%, 1/4W	12.1 k	1	TRW/IRC	T055
R239,240	RESISTOR, ±1%, 1/4W	20 k	2	TRW/IRC	T055
R228,225, 273	RESISTOR, ±1%, 1/4W	36.5 k	3	TRW/IRC	T055
R206	RESISTOR, ±1%, 1/4W	24.9 k	1	TRW/IRC	T055
R218	RESISTOR, ±1%, 1/4W	46.4 k	1	TRW/IRC	T055
R216	RESISTOR, ±1%, 1/4W	261 k	1	TRW/IRC	T055
R213	RESISTOR, ±1%, 1/4W	48.7 k	1	TRW/IRC	T055
R201,202, 205,,603, 616,629	RESISTOR, ±1%, 1/4W	49.9 k	6	TRW/IRC	T055
R612	RESISTOR, ±1%, 1/4W	56.2 k	1	TRW/IRC	T055
R208	RESISTOR, ±1%, 1/4W	73.2 k	1	TRW/IRC	T055
R219,244	RESISTOR, ±1%, 1/4W	71.5 k	2	TRW/IRC	T055
R606,619, 632	RESISTOR, ±1%, 1/4W	75 k	3	TRW/IRC	T055
R625	RESISTOR, ±1%, 1/4W	82.5 k	1	TRW/IRC	T055
R607,608, 609,610, 611,633, 634,635, 636,,637, 620,621, 622,623, 624	RESISTOR, ±1%, 1/4W	100 k	15	TRW/IRC	T055

P.C. ASSEMBLY — MEASURING & OUTPUT TERM. T263B (A2)

Ref. Desig.	Description		Qty.	Mfr.	Manufacturer's Number
R279	RESISTOR, ±1%, 1/4W	69.8 k	1	TRW/IRC	T055
R211	RESISTOR, ±1%, 1/4W	200 k	1	TRW/IRC	T055
R243	RESISTOR, ±1%, 1/4W	249 k	1	TRW/IRC	T055
R627	RESISTOR, ±1%, 1/4W	374 k	1	TRW/IRC	T055
R227,229	RESISTOR, ±1%, 1/4W	402 k	2	TRW/IRC	T055
R601,614	RESISTOR, ±1%, 1/4W	499 k	2	TRW/IRC	T055
R628,631	RESISTOR, ±1%, 1/4W	750 k	2	TRW/IRC	T055
R602,605, 615,618	RESISTOR, ±1%, 1/4W	1 Meg	4	TRW/IRC	T055
R249	RESISTOR, ±1%, 1/4W	SEL	1	TRW/IRC	T055
R214	RESISTOR, ±1%, 1/4W	196 k	1	TRW/IRC	T055
R207	RESISTOR, ±1%, 1/4W	107 k	1	TRW/IRC	T055
R254	RESISTOR, ±5%, 1/4W	47 ohm	1	TRW/IRC	RG-1/4
R253,217	RESISTOR, ±5%, 1/4W	1 k	2	TRW/IRC	RG-1/4
R250	RESISTOR, ±5%, 1/4W	2.7 k	1	TRW/IRC	RG-1/4
R251	RESISTOR, ±5%, 1/4W	3.3 k	1	TRW/IRC	RG-1/4
R230,255	RESISTOR, ±5%, 1/4W	4.7 k	2	TRW/IRC	RG-1/4
R235,252	RESISTOR, ±5%, 1/4W	10 k	2	TRW/IRC	RG-1/4
R234	RESISTOR, ±5%, 1/4W	15 k	1	TRW/IRC	RG-1/4
R231,275, 276,277, 261	RESISTOR, ±5%, 1/4W	100 k	5	TRW/IRC	RG-1/4
R223	POT, ±10%, 3/4W	2 k	1	Bourns	3009P-1-102
R233	POT, ±10%, 3/4W	5 k	1	Bourns	3009P-1-502
R245	POT, ±10%, 3/4W	10 k	1	Bourns	3009P-1-103
R215,604, 617,630	POT, ±10%, 3/4W	50 k	4	Bourns	3009P-1-503
C215,217 218,219, 220,224, 225,607, 608,612, 613,216	CAPACITOR, Tant., ±10%, 35V	10 uF	12	ITT	GA10G100
C201,202 203,204, 205,206, 207,208, 210,211	CAPACITOR, Mica ±1%, 100V	1000 pF	10	Elmenco	AM19FA102F04CR
C213,214	CAPACITOR, Mica ±1%, 100V	2000 pF	2	Elmenco	DM19FA202F04CR
C209	CAPACITOR, Tant., ±20%, 35V	1.0 uF	1	ITT	TAG-A1.0K35
C601,602 603,604, 605,606	CAPACITOR, Mono ±10%, 100V	2200 uF	6	Erie	8131-100-C0G0-22K
C212	CAPACITOR, Film ±10%, 100V	.022 uF	1	Sprague	225P22391WD3
C223	CAPACITOR, Film ±5%, 200V	2.16 uF	1	F-Dyne	MPE21-2.16-200-S
C221,222	CAPACITOR, Al. Elect., +50/-10%, 350V		2	Sprague	39D406F350GL4

P.C. ASSEMBLY — MEASURING & OUTPUT TERM. T263B (A2) continued

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
C227,226	CAPACITOR, Disc, NPO SEL	2		
C609,610, C611	CAPACITOR, Select from following list 10pF, 12pF, 15pF, 20pF, 22pF, 33pF	SEL 3	El-Menco	DM5CC-J04CR
U201-203 207,601-606	IC, Dual Op. Amp. (TL022CP-red dot)	10	Wilcom	0051-00-147
U204,205	IC, Dual Op. Amp. (TL022CP-white)	2	Wilcom	0051-00-148
U206	IC, Dual Op. Amp.	1	Raytheon	RC4558NB
Q201,202	TRANSISTOR, Silicon	2	Motorola	MPS A05
CR201,202 203,204, 205,206	DIODE, Sil., Sm. Sig	6		1N4148
U208	DIODE, Voltage Reference	1	National	LM313H
S3	SWITCH, Centralab Pushbutton, 5 pos., weighting	1	Wilcom	0263-10-104
S4	SWITCH, Centralab Pushbutton, 3 pos. Out Imped.	1	Wilcom	0262-01-115
J9	HEADER, Straight Post, 12 pos.	1	Amp	1-87348-2
J10	HEADER, Straight Post, 6 pos.	1	Amp	87348-6
	SPACERS	4	Wilcom	0051-00-139
	ANGLE BRACKET	4	Fed. Screw	36-510
	MOUNTING SPACER	1	Bivar	104-060

PARTS LIST

P.C. BOARD ASSEMBLY — GENERATOR (A3)

Ref. Desig.	Description		Qty.	Mfr.	Manufacturer's Number
	Printed Circuit Board		1	Wilcom	0262-10-126
R301,302 303	RESISTOR, ±1%, 3/4W	33.2 ohm	3	TRW/IRC	T060
R340,361	RESISTOR, ±1%, 1/4W	100 ohm	2	TRW/IRC	T055
R339	RESISTOR, ±1%, 1/4W	215 ohm	1	TRW/IRC	T055
R306,308	RESISTOR, ±1%, 1/4W	249 ohm	2	TRW/IRC	T055
R307	RESISTOR, ±1%, 1/4W	301 ohm	1	TRW/IRC	T055
R338	RESISTOR, ±1%, 1/4W	681 ohm	1	TRW/IRC	T055
R312	RESISTOR, ±1%, 1/4W	1.24 k	1	TRW/IRC	T055
R314	RESISTOR, ±1%, 1/4W	1.37 k	1	TRW/IRC	T055
R313	RESISTOR, ±1%, 1/4W	1.82 k	1	TRW/IRC	T055
R337	RESISTOR, ±1%, 1/4W	2.15 k	1	TRW/IRC	T055
R335	RESISTOR, ±1%, 1/4W	4.02 k	1	TRW/IRC	T055
R352	RESISTOR, ±1%, 1/4W	5.49 k	1	TRW/IRC	T055
R304	RESISTOR, ±1%, 1/4W	6.34 k	1	TRW/IRC	T055
R336	RESISTOR, ±1%, 1/4W	6.81 k	1	TRW/IRC	T055
R317,329, 330,332, 354	RESISTOR, ±1%, 1/4W	10.0 k	5	TRW/IRC	T055
R315	RESISTOR, ±1%, 1/4W	12.1 k	1	TRW/IRC	T055
R368	RESISTOR, ±1%, 1/4W	18.2 k	1	TRW/IRC	T055
R331	RESISTOR, ±1%, 1/4W	20.0 k	1	TRW/IRC	T055
R334,353, 363,364	RESISTOR, ±1%, 1/4W	100 k	4	TRW/IRC	T055
R309,310	RESISTOR, ±1%, 1/4W	200 k	2	TRW/IRC	T055
R370,371	RESISTOR, ±1%, 1/4W	SEL	2	TRW/IRC	T055
R320,322	RESISTOR, ±5%, 1/4W	10 ohm	2	TRW/IRC	RG-1/4
R341,342, 350,351	RESISTOR, ±5%, 1/4W	33 ohm	4	TRW/IRC	RG-1/4
R324,325	RESISTOR, ±5%, 1/4W	47 ohm	2	TRW/IRC	RG-1/4
R328	RESISTOR, ±5%, 1/4W	100 ohm	1	TRW/IRC	RG-1/4
R355	RESISTOR, ±5%, 1/4W	150 ohm	1	TRW/IRC	RG-1/4
R345,348, 349	RESISTOR, ±5%, 1/4W	220 ohm	3	TRW/IRC	RG-1/4
R346,347	RESISTOR, ±5%, 1/4W	2.2 k	2	TRW/IRC	RG-1/4
R343,344	RESISTOR, ±5%, 1/4W	6.8 k	2	TRW/IRC	RG-1/4
R323,356, 357,367	RESISTOR, ±5%, 1/4W	10 k	4	TRW/IRC	RG-1/4
R333	RESISTOR, ±5%, 1/4W	22 k	1	TRW/IRC	RG-1/4
R327,365, 366	RESISTOR, ±5%, 1/4W	47 k	3	TRW/IRC	RG-1/4
R326,358, 359,360	RESISTOR, ±5%, 1/4W	100 k	4	TRW/IRC	RG-1/4
R319,321	RESISTOR, ±5%, 1/4W	2.2 Meg	2	TRW/IRC	GBT 1/4 335J

P.C. BOARD ASSEMBLY — GENERATOR (A3) continued

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
R362	POT, 20 turn, ±10%, 3/4W 200 ohm	1	Bourns	3009P-1-201
R316	POT, 20 turn, ±10%, 3/4W 2 k	1	Bourns	3009P-1-202
C305,306	CAPACITOR, Mono ±10%, 100V 4700 pF	2	Erie	8141-100-C0G0-472K
C304	CAPACITOR, Disc, NPO SEL	1	Erie	
C311	CAPACITOR, Disc, 500V, N750 100 pF	1	Erie	851-000-U2J0-101J
C318	CAPACITOR, Disc, ±10%, 500V 470 pF	1	Erie	831-000-X5F0-471K
C312,313	CAPACITOR, Elect. +50/-10%, 470 pF 10V	2	Seimens	B41283-A3477-T
C301,302	CAPACITOR, Elect. +50/-10%, 40 uF 350V	2	Sprague	39D406F350GL4
C303	CAPACITOR, Mylar ±10%, 100V .1 uF	1	Sprague	225P10491WD3
C309,310	CAPACITOR, Tant ±10%, 20V 2.2 uF	2	Sprague	150D225X9020A2
C308	CAPACITOR, Tant ±10%, 20V 47 uF	1	Sprague	150D476X9020R2
C314,315	CAPACITOR, Tant ±20%, 10V 100 uF	2	Sprague	150D107X9010R2
C307,316, 317	CAPACITOR, Tant ±10%, 35V 10 uF	3	ITT	GA010G100
CR301,302, 303,304	DIODE, Sil. Rect.	4		1N4005
CR305,306, 307,308	DIODE, Sil. Sig	4		1N4148
Q301,304 305,306	TRANSISTOR, Sil, NPN	4	Motorola	MPS A05
Q302,303, 307	TRANSISTOR, Sil PNP	3	Motorola	MPS A55
VR301	DIODE, Zener, 13V	1		1N5243
U301	IC, Dual Op. Amp. (TL022CP-yellow)	1	Wilcom	0051-00-136
U302	IC, Dual Op. Amp (TL022CP-red)	1	Wilcom	0051-00-147
U304	IC, Transcond Op. Amp.	1	RCA	CA3080E
U303	IC, Dual Op. Amp	1	Raytheon	RC4558NB
U305	IC, Quad. XMSNGATE	1	RCA	CD4016AE or CD4066AE
S5	SWITCH, Centralab Pushbutton, 8 pos., Measure Function	1	Wilcom	0262-01-116
S6	SWITCH, Centralab Pushbutton, 5 pos., Generator Level	1	Wilcom	0262-01-119
	SHIELD	1	Wilcom	0262-10-131
	SHIELD	1	Wilcom	0262-01-122
	ANGLE BRACKET	4	Fed. Screw	36-510
	STANDOFF	4	Wilcom	0051-00-139
	STANDOFF	2	Amatom	8218-B-0440-3A
J11	HEADER, Straight Post, 12 pos.	1	Amp	1-87348-2
J13	HEADER, Straight Post, 8 pos.	1	Amp	87348-8
J12,14	HEADER, Straight Post, 6 pos.	2	Amp	87348-6

PARTS LIST

PRINTED CIRCUIT ASSEMBLY, PREAMPLIFIER (A4)

Ref. Desig.	Description		Qty.	Mfr.	Manufacturer's Number
	Printed Circuit Board		1	Wilcom	0262-01-132
R410,413, 414	RESISTOR, ±5%, 1/4W	100 ohm	3	TRW/IRC	RG-1/4
R404,411	RESISTOR, ±5%, 1/4W	4.7 k	2	TRW/IRC	RG-1/4
R403,409	RESISTOR, ±5%, 1/4W	10 k	2	TRW/IRC	RG-1/4
R408	RESISTOR, ±5%, 1/4W	22 k	1	TRW/IRC	RG-1/4
R412	RESISTOR, ±5%, 1/4W	100 k	1	TRW/IRC	RG-1/4
R406	RESISTOR, ±1%, 1/4W	2.00 k	1	TRW/IRC	T055
R401	RESISTOR, ±1%, 1/4W	3.40 k	1	TRW/IRC	T055
R405	RESISTOR, ±1%, 1/4W	10.0 k	1	TRW/IRC	T055
R402	RESISTOR, ±1%, 1/4W	100.0 k	1	TRW/IRC	T055
U401	RESISTOR NETWORK, 5 dB (TRW/IRC #WP010)	100 k	1	Wilcom	0262-01-112
C403	CAPACITOR, Disc ±5%, 500V NPO	35 pF	1	Erie	851-000-C0G0-330J
C404	CAPACITOR, Disc ±10%, 1000V N330	120 pF	1	Sprague	10TS-T12
C401	CAPACITOR, Disc ±10%, 500V X5F	220 pF	1	Erie	831-000-X5F0-221K
C405	CAPACITOR, Tant ±20%, 10V	33 uF	1	ITT	TAG-A33M10
C406,407	CAPACITOR, Tant ±20%, 10V	33 uF	2	Mallory	T1M336M010P0Y (or V)
C402	CAPACITOR, Tant ±10%, 20V	47 uF	1	Sprague	150D476X9020R2
CR401	DIODE, Sil. Sml. Sig.		1	ITT	1N4148
Q401,403	TRANSISTOR, Sil. Sml. Sig.	NPN	2	Motorola	MPS6521
Q402	TRANSISTOR, Sil. Sml. Sig.	PNP	1	Motorola	MPS6523
S7	SWITCH, Rot. Centralab, 1 pole 10 pos.		1	Wilcom	0194-00-106
T1	TRANSFORMER, Input (Teco #6186)		1	Wilcom	0262-01-121
J15	HEADER, Straight Post		1	Amp	1-87348-2
	MOUNTING BRACKET		1	Wilcom	0262-01-110
	SPACER		1	Amatom	8226-B-0632

PARTS LIST

P.C. ASSEMBLY — FREQUENCY SELECT (A5)

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
	Printed Circuit Board	1	Wilcom	0262-10-127
U501,502	RESISTOR NETWORK, Freq. Sel. (TRW/IRC #WP011)	2	Wilcom	0262-01-113
S8	SWITCH, Rotary, 2 deck, P.C. Mount, 2 pole, 10 pos. (Centralab)	1	Wilcom	0194-00-108
J16	HEADER, Right Angle Post	1	Molex	22-05-2061

PARTS LIST

P.C. BOARD ASSEMBLY — POWER SUPPLY (A6)

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
	Printed Circuit Board	1	Wilcom	0262-10-117
R1	RESISTOR, ±1%, 4W 681 ohm	1	TRW/IRC	GS-3
C3	CAPACITOR, Elect. ±20%, 150V 10 uF	1	Sprague	TVA1406
C1,2	CAPACITOR, Tant ±10%, 35V 10 uF	2	ITT	GA010G100
CR1,2,3,4	DIODE, Rectifier, 1A	4		1N4005
VR1,2	DIODE, Zener, 9.1V, 1W	2		1N4739
FU1	FUSE, 3AG, 1/8 Amp Normal-Blo	1	Littlefuse	312.125
	FUSE CLIP	2	Littlefuse	102069
J18,19	HEADER, Straight Post	2	Amp	1-87348-0
	STANDOFF	1	Amatom	9531B-B-0632
	BATTERY STRAP	2	Keystone	#75
	RUBBER MTG. PAD	1	3M Co.	SJ-5112

PARTS LIST

T287 ACCESSORY COVER OPTIONS

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
	ACCESSORY COVER ASSEMBLY	1	Wilcom	0287-01-098
	STORAGE COVER ASSEMBLY DIAL & TALK SIDE (T287-03)	1	Wilcom	0287-01-013
	STORAGE COVER ASSEMBLY OSCILLATOR SIDE (T287-04)	1	Wilcom	0287-01-018
	SWITCH SHUTOFF	1	Wilcom	0287-01-119

PANEL ASSEMBLY & WIRING POWER SUPPLY

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
	PANEL, POWER SUPPLY	1	Wilcom	0287-01-114
	PRINTED CIRCUIT ASSEMBLY	1	Wilcom	0287-01-005
	JACK	1	Switchcraft	JJ095
	BATTERY HOLDER	1	Keystone	158
	WASHER, Insulating polarizing	2	Keystone	59

P.C. BOARD ASSEMBLY — POWER SUPPLY

Ref. Desig.	Description		Qty.	Mfr.	Manufacturer's Number
	P.C. BOARD		1	Wilcom	0287-01-105
R1	RESISTOR, ±5%, 5W	.220 ohm	1	Ward Leonard	5XM220
R3	RESISTOR, ±5%, 1/4W	1.0 k	1	TRW/IRC	RG-1/4
R2	RESISTOR, ±5%, 1/4W	6.8 k	1	TRW/IRC	RG-1/4
R4	RESISTOR, ±5%, 1/4W	100 ohm	1	TRW/IRC	RG-1/4
C1	CAPACITOR, Tant, ±20%, 35V	10 uF	1	ITT	TAG-A10M35
C2	CAPACITOR, Tant, ±10%, 10V	33 uF	1	ITT	TAP-A33K10
CR1	DIODE, Rectifier, 1A		1		1N4005
VR1	DIODE, Zener, 6.2V, 5W		1	Motorola	1N5234A
Q1	TRANSISTOR,	PNP	1	Motorola	MJE 350
J101,102	CONNECTOR RECEPTACLE		2	Molex	03-06-1031
	CONTACT		4	Molex	02-06-1103
	BRACKET, P.C. BOARD		1	Wilcom	0287-01-108

PANEL ASSEMBLY & WIRING — TALK CIRCUIT (T287-01)

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
	P.C. ASSEMBLY	1	Wilcom	0287-01-011
	PANEL, TALK CIRCUIT	1	Wilcom	0287-01-103

PANEL ASSEMBLY & WIRING — TALK CIRCUIT (T287-01) continued

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
P102	CONNECTOR, PLUG	1	Molex	03-06-2031
	CONTACT, MALE	2	Molex	02-06-2103
	BINDING POST	1	Grayhill	29-1R
	BINDING POST	1	Grayhill	29-1B
S2	SWITCH	1	JBT	JMT-323
	DIAL ASSEMBLY, Type 51-A	1	Auto. Elect	D-84820-C
J3	JACK	1	Switchcraft	111
J4	JACK	1	Switchcraft	113
J1,2	JACK	2	Switchcraft	12B

P.C. ASSEMBLY — TALK CIRCUIT

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
	P.C. BOARD	1	Wilcom	0287-01-111
S3	SWITCH, Rotary	1	Wilcom	0262-02-136
R7	RESISTOR, ±1%, 4W 221 ohm	1	TRW/IRC	GS-3
R3,4	RESISTOR, ±5%, 1/4W 22 ohm	2	TRW/IRC	RG-1/4
R2	RESISTOR, ±5%, 1/4W 68 ohm	1	TRW/IRC	RG-1/4
R1	RESISTOR, ±5%, 1/4W 180 ohm	1	TRW/IRC	RG-1/4
R6	RESISTOR, ±5%, 1/4W 1.0 k	1	TRW/IRC	RG-1/4
R5	RESISTOR, ±5%, 1/4W 3.3 k	1	TRW/IRC	RG-1/4
RV1	VARISTOR, 7.1 V - 8.8 V 100 mA	1	Veco	023L1
RV2	VARISTOR, 8.8 V - 10.8 V 10 mA	1	Veco	063L1
RV3	VARISTOR, .6V 1 mA	1	Veco	SV100A
C1	CAPACITOR, Mylar ±10%, 200V .12 uF	1	F-Dyne	PED-21-.12-200-10
C3,5	CAPACITOR, Film ±10%, 100V .47 uF	2	Sprague	225P47491XD3
C2	CAPCTITOR, Mylar ±5%, 50V 2.2 uF	1	F-Dyne	MPE11-2.2-50-5
C4	CAPACITOR, Tant ±20%, 35V 10 uF	1	ITT	TAG-A10M35
L1	INDUCTOR, (TECO 6340) 600 mH	1	Wilcom	0262-02-130
T1	TRANSFORMER (TECO 6339)	1	Wilcom	0262-02-128
T2	TRANSFORMER (TECO 6341)	1	Wilcom	0262-02-129
CR1-4	DIODE, Sil. Sm. Sig.	4		1N4148
Q1	TRANSISTOR, NPN	1		MPS A05
	STANDOFF	2	Amatom	8172-A-0632

PANEL ASSEMBLY & WIRING — OSCILLATOR (T287-02)

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
	PANEL, OSCILLATOR	1	Wilcom	0287-01-116
	P.C. ASSEMBLY, OSCILLATOR	1	Wilcom	0287-01-006
	P.C. ASSEMBLY, DISPLAY	1	Wilcom	0287-01-007
	WINDOW, RED	1	Wilcom	0287-01-117
	SWITCH SHUTOFF	1	Wilcom	0287-01-119

PANEL ASSEMBLY & WIRING — OSCILLATOR (T287-02) continued

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
S3	SWITCH	1	Switchcraft	976
S2	SWITCH	1	Alco	MTA 105D
J1	JACK	1	Switchcraft	C-55B
P101	CONNECTOR, PLUG	1	Molex	03-06-2031
	CONTACT	2	Molex	02-06-2103
DS1	LED	1	Xciton	XC526-2
	LED HOLDER	1	Xciton	C-160
	WASHER, Nylon #6	1	Amatom	2203-N129
	BRACKET	1	Fed. Screw	36-510
	KNOB, Black	1	Buckeye	PS-95-2BLK
	KNOB, Black	1	Buckeye	PS-70BL-1 BLK

P.C. ASSEMBLY, OSCILLATOR

Ref. Desig.	Description		Qty.	Mfr.	Manufacturer's Number
	P.C. BOARD		1	Wilcom	0287-01-106
R36	RESISTOR, 1%, 1/4W	2.00 k	1	TRW/IRC	T055
R2,12	RESISTOR, 1%, 1/4W	5.11 k	2	TRW/IRC	T055
R34	RESISTOR, 1%, 1/4W	8.06 k	1	TRW/IRC	T055
R7,8	RESISTOR, 1%, 1/4W	20.0 k	2	TRW/IRC	T055
R5,17	RESISTOR, 1%, 1/4W	750 k	2	TRW/IRC	T055
R35	RESISTOR, 1%, 1/4W	SEL	1	TRW/IRC	T055
R25	RESISTOR, 5%, 1/4W	10 ohm	1	TRW/IRC	RG-1/4
R24	RESISTOR, 5%, 1/4W	100 ohm	1	TRW/IRC	RG-1/4
R19,32	RESISTOR, 5%, 1/4W	220 ohm	2	TRW/IRC	RG-1/4
R37	RESISTOR, 5%, 1/4W	470 ohm	1	TRW/IRC	RG-1/4
R3,13	RESISTOR, 5%, 1/4W	510 ohm	2	TRW/IRC	RG-1/4
R54	RESISTOR, 5%, 1/4W	1 k	1	TRW/IRC	RG-1/4
R53	RESISTOR, 5%, 1/4W	1.5 k	1	TRW/IRC	RG-1/4
R33	RESISTOR, 5%, 1/4W	3.9 k	1	TRW/IRC	RG-1/4
R23	RESISTOR, 5%, 1/4W	6.8 k	1	TRW/IRC	RG-1/4
R9,10,11, 14,15,20, 21,26,27, 28,29,30, 52	RESISTOR, 5%, 1/4W	10 k	13	TRW/IRC	RG-1/4
R31	RESISTOR, 5%, 1/4W	100 k	1	TRW/IRC	RG-1/4
R4,16	RESISTOR, 5%, 1/4W	330 k	2	TRW/IRC	RG-1/4
R6,18	RESISTOR, 5%, 1/4W	SEL	2	TRW/IRC	GBT-1/4
C5,6,12, 13,15,22, 23,24,25, 26,27,33, 34	CAPACITOR, Elect. 20%, 35V	10 uF	13	ITT	TAG-A1M032
C8,14,16 17	CAPACITOR, Elect. 20%, 10V	33 uF	4	ITT	TAP-A33M10
C4,11	CAPACITOR, AXIALPE 2%, 100V	.027 uF	2	F-Dyne	PE11-.027-100-2
C2,9	CAPACITOR, Mica 1%, 500V	1500 pF	2	Elmenco	DM19FD152F04CR
C3,10	CAPACITOR, Mica 5%, 300V	6800 pF	2	Elmenco	DM19FC682J04CR
C20,21	CAPACITOR, Mono 20%, 50V	.1 uF	2	Sprague	7CZ5U104X0050D1
C18,19	CAPACITOR, Disc 10%, 500V	.002 uF	2	Erie	871-000-X5F0-202K

P.C. ASSEMBLY, OSCILLATOR continued

Ref. Desig.	Description		Qty.	Mfr.	Manufacturer's Number
C1,7	CAPACITOR, Disc 5%, 500V	10 pF	2	Erie	831-000-U2J0-100D
S1	SWITCH		1	Stackpole	#73-9000
T1	TRANSFORMER		1	TECO	5053
	STANDOFF, Swag 15/16 long		3	Amatom	9544B-B-0440
U1	IC, Quad op amp		1	Harris	HA1-4605-5
U2	IC, Dual Mono		1	RCA	CD4098BE
U3	IC, Dual op amp		1	Signetics	NE532V
Q1	FET		1	Siliconix	E113
Q2	TRANSISTOR	PNP	1	Motorola	MPS 6523
Q3	TRANSISTOR	PNP	1	Motorola	MPS A55
Q4	TRANSISTOR	NPN	1	Motorola	MPS A05
Q5	TRANSISTOR	NPN	1	Motorola	MPS 6521
VR1	VOLTAGE REGULATOR		1	National	LM313H
VR2	CURRENT REGULATOR DIODE		1	Siliconix	E500
CR1,2,3 4,5,6	DIODE, Sm. Signal		6		
R1	DUAL POT	10 k	1	Bourns	81A2AB28A15/A15
R22	POT	10 k	1	Bourns	3389W-1-103

P.C. ASSEMBLY, DISPLAY

Ref. Desig.	Description		Qty.	Mfr.	Manufacturer's Number
	P.C. BOARD		1	Wilcom	0287-01-107
	SOCKET, RT. ANGLE		1	Aries	#16-810-90
Y1	XTAL, HC6 Case, AT Cut 6.5536 MHz		1	In. Crysal	433341
R45-51	RESISTOR, 5%, 1/4W	100 ohm	7	TRW/IRC	RG-1/r
R39	RESISTOR, 5%, 1/4W	510 ohm	1	TRW/IRC	RG-1/4
R42	RESISTOR, 5%, 1/4W	1.0 k	1	TRW/IRC	RG-1/4
R40	RESISTOR, 5%, 1/4W	22 k	1	TRW/IRC	RG-1/4
R41,43,44, 52	RESISTOR, 5%, 1/4W	47 k	4	TRW/IRC	RG-1/4
R38	RESISTOR, 5%, 1/4W	100 k	1	TRW/IRC	RG-1/4
C28,30	CAPACITOR, Elect 20%, 35V	10 uF	2	ITT	TAG-A10M35
C31	CAPACITOR, Elect 20%, 10V	33 uF	1	ITT	TAP-A33M10
C29	CAPACITOR, Disc 5%, 500V	100 pF	1	Erie	851-000-U2J0-101J
C32	CAPACITOR, Disc 5%, 500V	22 pF	1	Erie	831-000-U2J0-220J
C35	CAPACITOR, Disc 5%, 500V	SEL	1		
CR7	DIODE, Silicon		1		1N4005
U4	IC, Phase Lock Loop		1	RCA	CD4046AE
U5	IC, Divide by N Counter		1	RCA	CD4018AE
U6	IC, Counter		1	Intersil	ICM7208IPI
U7	IC, Osc.		1	Intersil	ICM7207IPD
DS1	DISPLAY, Led		1	Hew. Packard	HP-5082-7415

10.0 DIFFERENCE DATA

10.1 General

10.1.01 This section of the manual indicates information relative to changes in circuitry, operation, and features of the Model T262B/T263B Transmission and Noise Test Sets.

wilcom
WILCOM PRODUCTS INC.
DANIEL WEBSTER HIGHWAY
P.O. BOX 508 LACONIA, N.H. 03246

MANUAL CHANGE INFORMATION

PRODUCT T262B/T263B

CHANGE REF. 712

DATE 6-30-77

CHANGE	DESCRIPTION

Serial Number:

T262B/BR - Serial No. 326 and up.
T263B/BR - Serial No. 151 and up.

Engineering Change Order 712 replaces HOLD & LINE SELECT printed circuit assembly A1, 0262-10-024, with Printed Circuit Assembly A1, 0262-10-024 Rev A. Schematic drawing 0262-10-324 is replaced with 0262-10-324 Rev A. Changes in the parts list and in FIGURES 5-1, 8-1, and 8-2 are as follows:

FIGURE 5-1 delete Q111 and Q112 in Hold & Line Select Circuits FIGURE 5-1.

FIGURE 8-1 and 8-2 are included on the pages following the parts list.

PARTS LIST

P.C. ASSEMBLY HOLD AND LINE SELECT CIRCUIT (A4)

Ref. Desig.	Description		Qty	Mfr.	Manufacturer's Number
	Printed Circuit Board		1	Wilcom	0262-10-124
R111,123	RESISTOR, ±1%, 3/4W	16.5 ohm	2	TRW/IRC	T060
R101,102 113,114, 103,106, 115,118	RESISTOR, ±1%, 3/4W	24.9 ohm	8	TRW/IRC	T060
R104,105, 110,116, 117,122	RESISTOR, ±5%, 1/4W	100 ohm	6	TRW/IRC	RG-1/4
R112,109	RESISTOR, ±5%, 1/4W	1 k	2	TRW/IRC	RG-1/4
R108,120	RESISTOR, ±1%, 1/4W	35.7 k	2	TRW/IRC	T055
R107,119	RESISTOR, ±1%, 1/4W	100 k	2	TRW/IRC	T055
RV101,102	VARISTOR		2	G.E.	V130La10A
C101,102	CAPACITOR, Tant ±10%, 20V	10 µF	2	Sprague	150D106X9020B2
C106	CAPACITOR, RADIALMPE, 200V	.22 µF	1	Paktron	224K02WC687
CR101-106, 108-113	DIODE, 1A Sil. Rect.		12		1N4005
C105	CAPACITOR, ±20%, 150V	10 µF	1	Sprague	TVA1406
Q104,109	TRANSISTOR, Sil High V,	PNP	2	Motorola	MPS A92
Q105,110	TRANSISTOR, Sil Pwr,	NPN	2	Motorola	MJE 340
Q101,102, 103,106, 107,108	TRANSISTOR, Sil	PNP	6	Motorola	MPS A55
J5,7	HEADER, Straight Post, 4 pos		2	Amp	87348-4
J8,4	HEADER, Straight Post, 6 pos		2	Amp	87348-6
S2	SWITCH, Centralab Pushbutton, 6 pos., Hold & Line Select		1	Wilcom	0262-10-111

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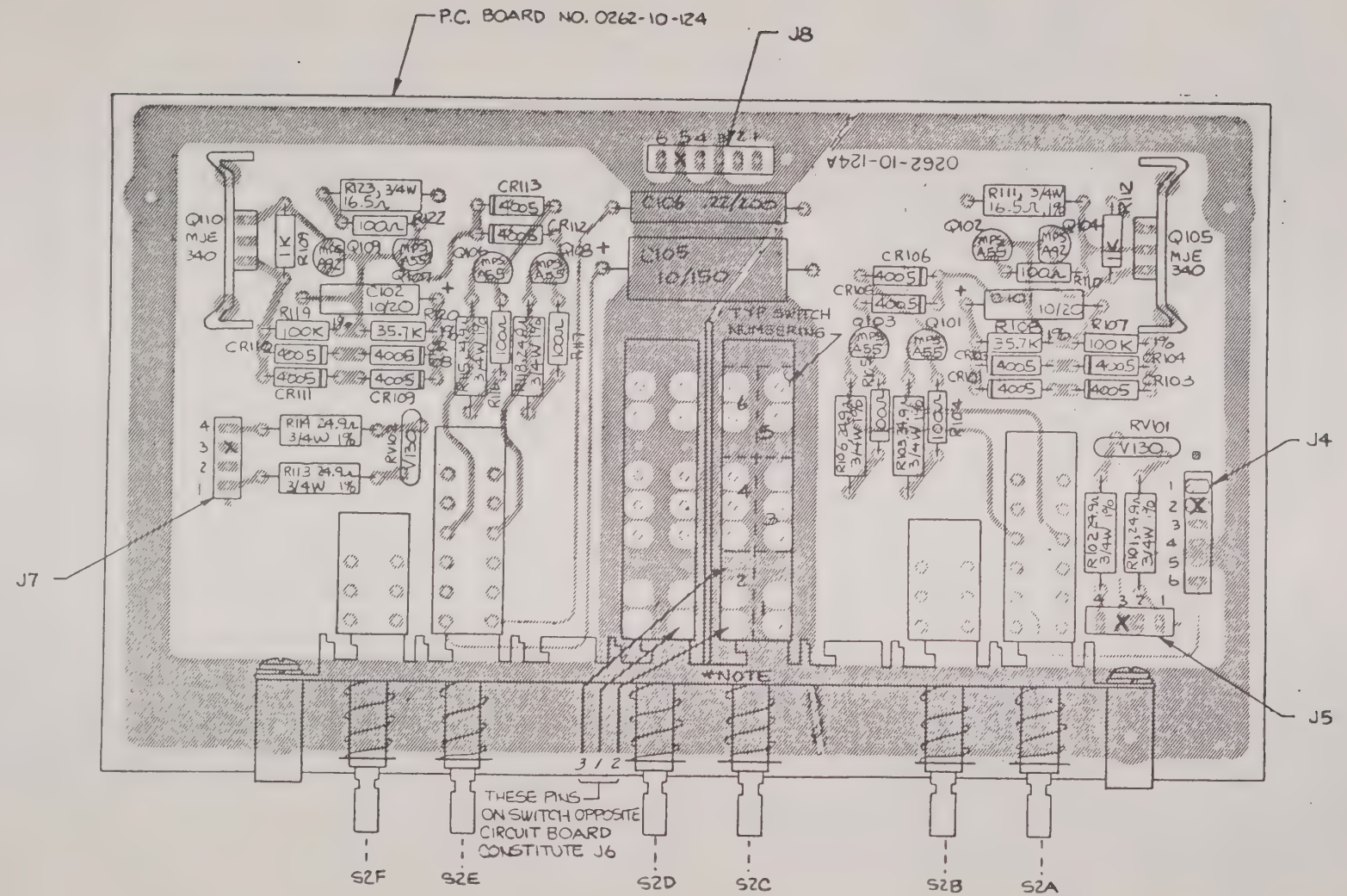
MANUAL CHANGE INFORMATION

PRODUCT T262B/T263B
CHANGE REF. 712
DATE 6-30-77

CHANGE	DESCRIPTION

P.C. ASSEMBLY HOLD AND LINE SELECT CIRCUIT (A4) Continued

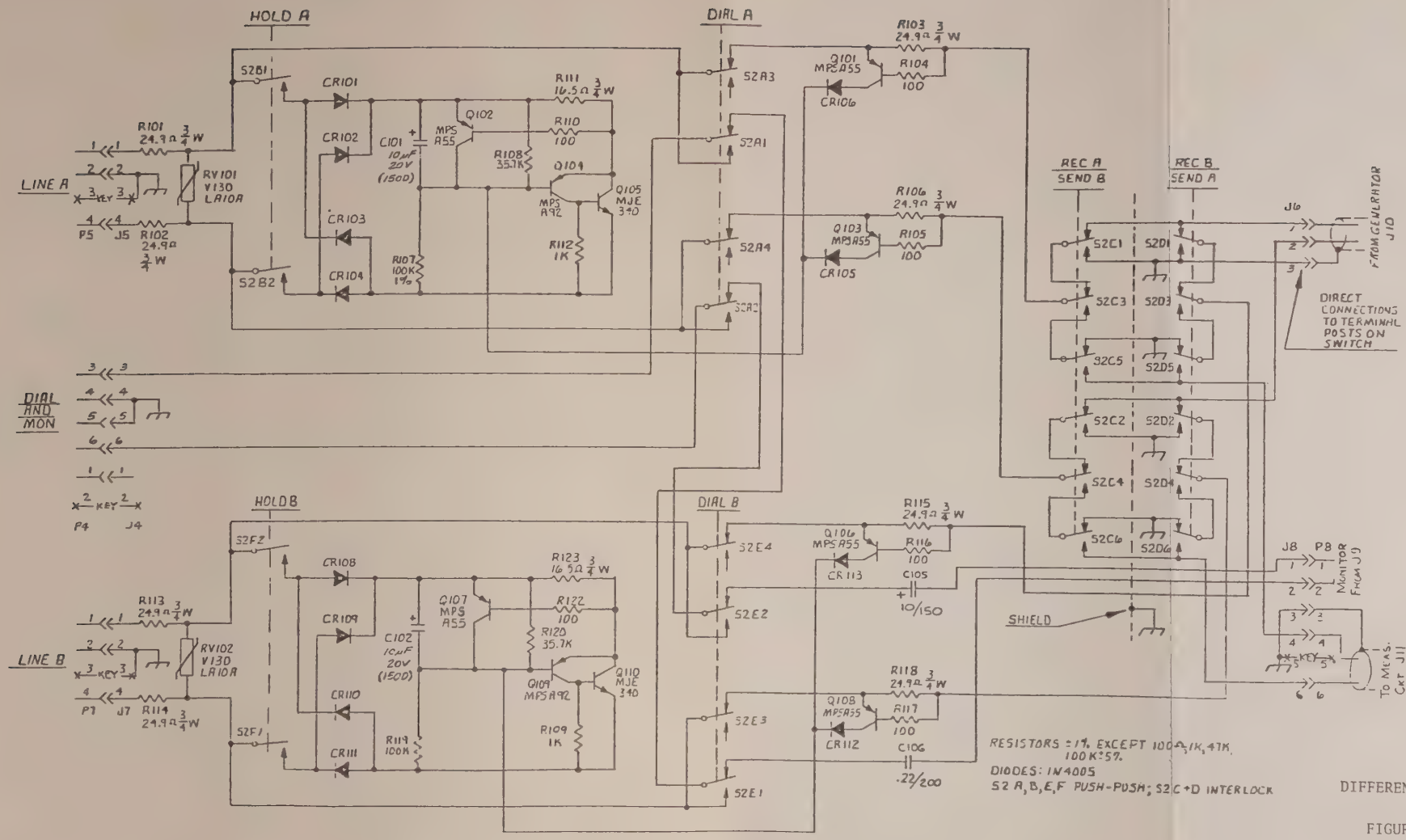
Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
	MTG Hardware Kit	2	Motorola	MK77-2
	HEAT SINK	2	I.E.R.C.	PSB2-IND
	SHIELD	1	Wilcom	0221-01-119
	SHIELD	1	Wilcom	0262-10-132
	SPACER	2	Wilcom	0051-00-139



DIFFERENCE DATA

FIGURE 8-1

HOLD AND LINE SELECT P.C. ASSEMBLY



DIFFERENCE DATA

FIGURE 8-2

HOLD AND LINE SELECT SCHEMATIC

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MANUAL CHANGE INFORMATION

PRODUCT T262B/T263B

CHANGE REF. 722

DATE 6-30-77

CHANGE	DESCRIPTION

Serial Numbers:

T262B/BR — Serial No. 286 and up.
T263B/BR — Serial No. 151 and up.

Engineering Change Order 722 was made in order to eliminate interference between the 200 Hz - 20 kHz weighting circuit and the noise weighting circuits. The unused section of S3 was utilized to ground the interfering point of the noise weighting circuit when the 200 Hz - 20 kHz weighting is being used.

The figures where the change has been effected are 8-3, 8-4, 8-5 and 8-6.

The P.C. assembly and schematic drawing sections affected are shown below.

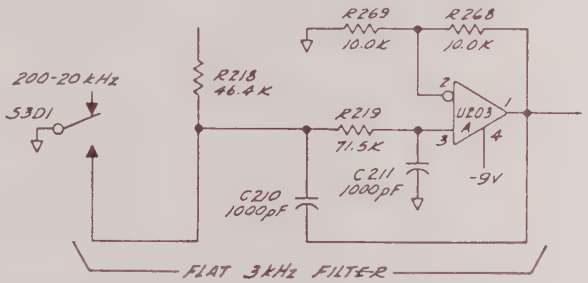
MODEL T262B:

MODEL T263B:

MEASURING AND OUTPUT TERMINATION —

Schematic —

Figures 8-3 and 8-5



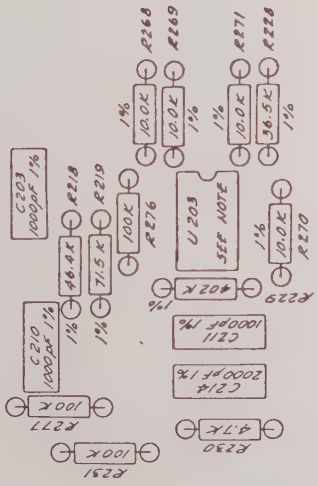
MODEL T262B:

MODEL T263B:

MEASURING AND OUTPUT TERMINATION —

P.C. assembly —

Figures 8-4 and 8-6



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MANUAL CHANGE INFORMATION

PRODUCT 262B&BR-263B&BR
CHANGE REF. 744,745
DATE 8/30/77

CHANGE	DESCRIPTION

Engineering Change Order 744 and 745 replaces P.C. Board assembly Preamplifier 0262-01-032 with P.C. Board assembly Preamplifier 0265-90-013. Changes in the Parts List and Figures are as follows:

8-13 Preamplifier P.C. assembly (A4)
8-14 Preamplifier Schematic

PARTS LIST

FRONT PANEL ASSEMBLY AND WIRING T262B/T263B

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
A4	P.C. ASSEMBLY PREAMPLIFIER	1	Wilcom	0265-90-013

PRINTED CIRCUIT ASSEMBLY PREAMPLIFIER

Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
	P.C. BOARD	1	Wilcom	0265-90-113
R407, 409	RESISTOR, 5%, 1/4W 100 ohm	2	TRW/IRC	RG-1/4
R404	RESISTOR, 5%, 1/4W 3.3K	1	TRW/IRC	RG-1/4
R403	RESISTOR, 5%, 1/4W 10K	1	TRW/IRC	RG-1/4
R410	RESISTOR, 1%, 1/4W 681 ohm	1	TRW/IRC	T055
R406	RESISTOR, 1%, 1/4W 2.00K	1	TRW/IRC	T055
R411	RESISTOR, 1%, 1/4W 2.49K	1	TRW/IRC	T055
R408	RESISTOR, 1%, 1/4W 3.32K	1	TRW/IRC	T055
R401	RESISTOR, 1%, 1/4W 3.40K	1	TRW/IRC	T055
R405	RESISTOR, 1%, 1/4W 10.0K	1	TRW/IRC	T055
R402	RESISTOR, 1%, 1/4W 100K	1	TRW/IRC	T055
C403	CAPACITOR, Disc ±5%, 500V 22 pF	1	Erie	851-000-C0G0-220J
C404	CAPACITOR, Disc ±10%, 1000V 120 pF	1	Sprague	10TS-T12
C401	CAPACITOR, Disc ±10%, 1000V 220 pF	1	Erie	831-000-X5F0-221K
C405,406	CAPACITOR, Tant. Elect ±20% 35V 10 uF	2	ITT	TAG-A10M35
C402	CAPACITOR, Tant ±10%, 20V 47 uF	1	Sprague	150D476X9020R2
Q401,403, 404,405	TRANSISTOR, Sil. Sm. Sig. NPN	4	Motorola	MPS6521
Q402	TRANSISTOR, Sil. Sm. Sig. PNP	1	Motorola	MPS6523
U401	RESISTOR NETWORK, 5dB STEP ATTEN. 100K	1	Wilcom	0262-01-112
CR401	DIODE, Current Reg. 430uA	1	Siliconix	E502
S7	SWITCH, Rotary, Centralab, 1Pole, 10 Pos.	1	Wilcom	0194-00-106
T1	TRANSFORMER, Input (TECO6186)	1	Wilcom	0262-01-121

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MANUAL CHANGE INFORMATION

PRODUCT 262B&BR-263B&BR

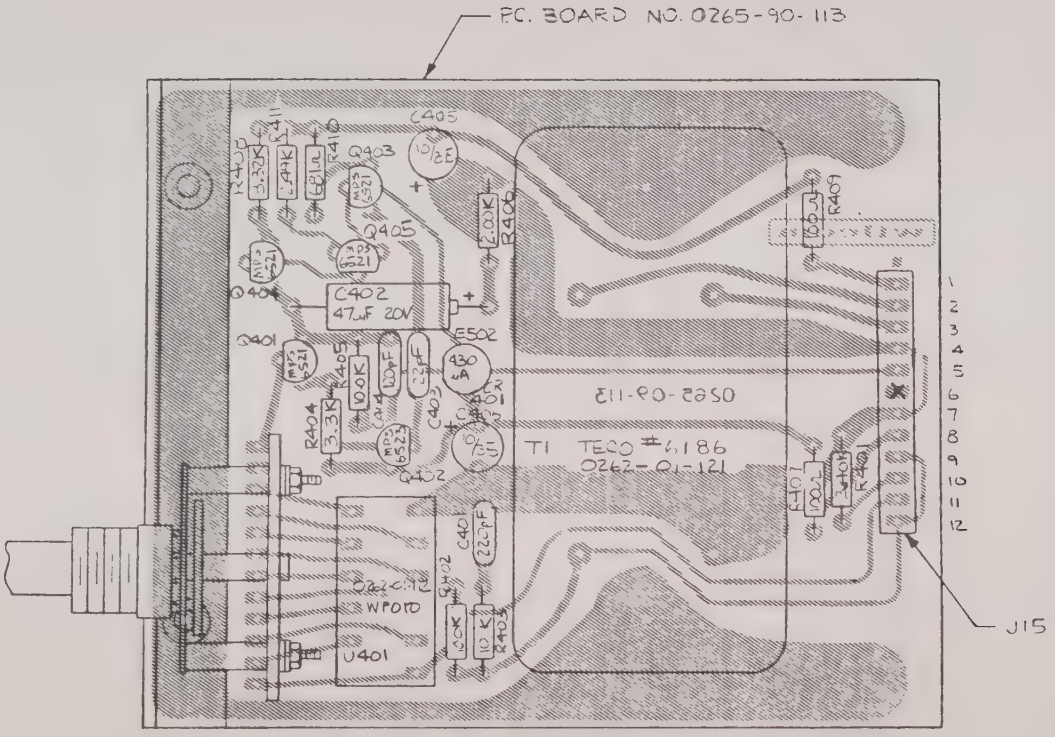
CHANGE REF. 744-745

DATE 8-30-77

CHANGE	DESCRIPTION

PRINTED CIRCUIT ASSEMBLY PREAMPLIFIER (CONTINUED)

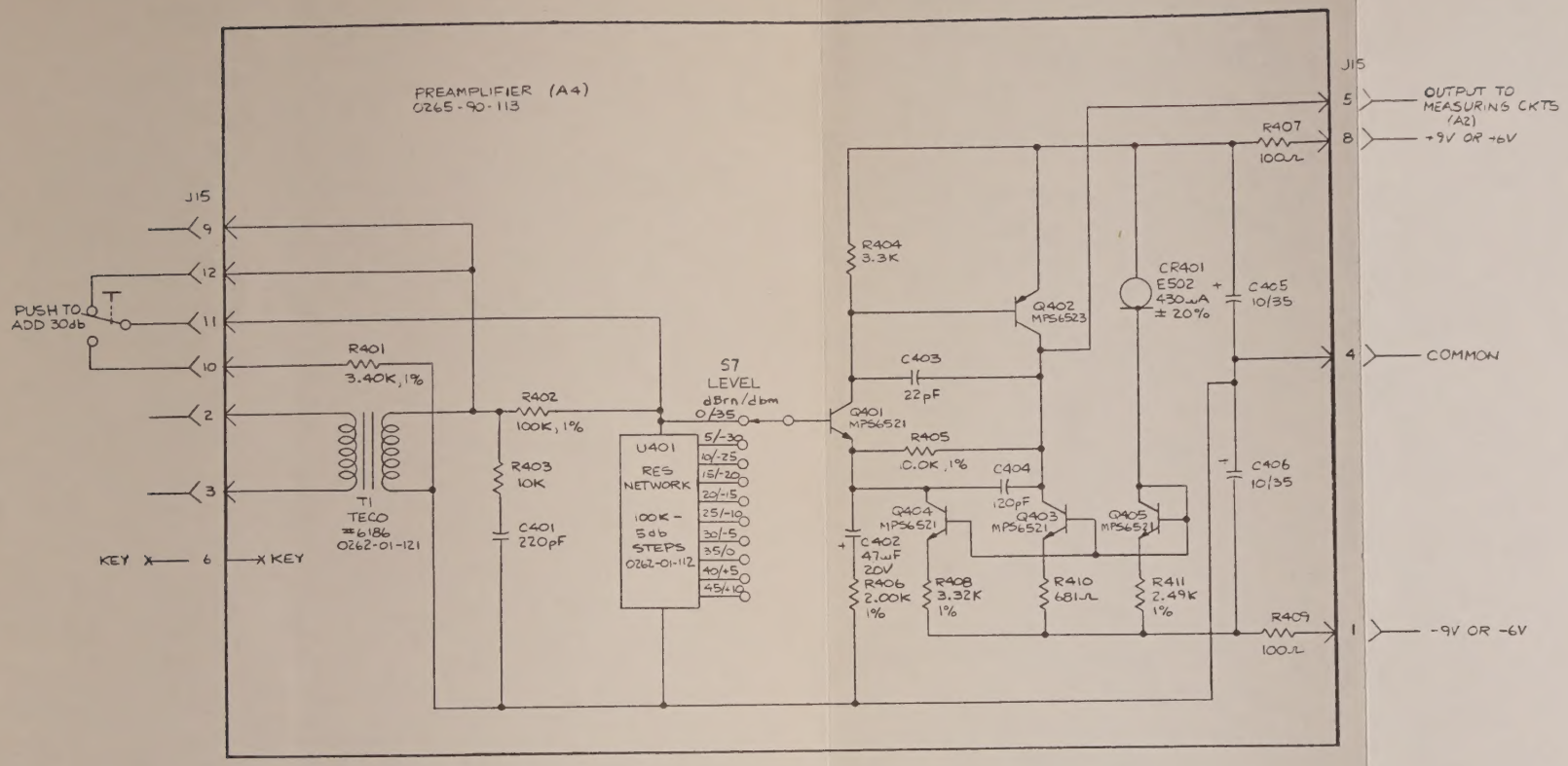
Ref. Desig.	Description	Qty.	Mfr.	Manufacturer's Number
J15	HEADER, Straight Post, 12 pos.	1	AMP	1-87348-2
	BRACKET, Mounting	1	Wilcom	0262-01-110



DIFFERENCE DATA

FIGURE 8-13

PREAMPLIFIER P.C. ASSEMBLY



NOTES:
1. UNLESS OTHERWISE SPECIFIED -
   A. ALL RESISTORS 1/4W 5%
   B. ALL CAPACITORS IN uF
   C. ALL SWITCHES SHOWN IN RELEASED POSITION
2. THIS SCHEMATIC IS PART OF OVERALL SCHEMATIC NO. 0265-90-300.

DIFFERENCE DATA

FIGURE 8-14
PREAMPLIFIER
SCHEMATIC